QUEENSLAND AGRICULTURAL JOURNAL

VOL. XII. AUGUST, 1919. PART 2.

Agriculture.

SILOS AND SILO CONSTRUCTION.

By ARTHUR MORRY, Architect, Surveyor to the Department of Agriculture.

The Advantages of the Silo.—Larger quantity of food can be preserved by this method, of its original value, than by any other means.

In dry-curing methods the losses are large in comparison with small losses in silo-curing.

Storage is cheap, and the food is free from danger, from fire, rain, vermin, or insects.

Size of Silo Required.—One of the first things to be considered is that about 40 lb. per day of ensilage is considered a proper quantity for milch cows. Twenty cows would thus require 800 lb. per day; 180 days or six months would thus require 64 tons of ensilage.

If silo built round, the diameter should be 15 ft., and it would require to be 21 ft. high to hold the above quantity, viz.—64 tons. Adopting 15 ft. as a convenient standard diameter, the capacity of any silo can be easily calculated, because every foot in depth would contain a little over 3 tons of ensilage when properly settled down.

The greater the depth, as a rule, the better ensilage is obtained, on account of the increased pressure.

For silos of 50 tons or less, the diameter should not exceed 12 ft., and every foot in depth would then contain about 2.08 tons.

Round silos are preferable to square or rectangular or octagonal, and are, in fact, cheaper to build than either of the latter, because less material is required to contain a given amount of ensilage, and the walls may be thinner on account of the circular form being better able to resist pressure than the others. Another point in favour of the round silo is that no corners exist for air accumulation.

The pressure of silo walls, from the inside, has been proved to be equal to 11 lb. per square foot for each foot in depth; that is to say, that at 10 ft. from the top the pressure would be equal to 110 lb., and at 20 ft. to 220 lb. per superficial foot, and provision must be made to resist this.

A square or rectangular silo would require to be strongly buttressed with walls at least 14 in. thick, instead of 5 in. for the round silo. The walls should also be smooth and straight, to assist in the settlement of the mass, and rigid and strong, because, if allowed to spring, air spaces will be created.

When the ensilage has settled down permanently there is no longer any pressure on the walls, as it forms a kind of mat holding itself together.

It is better to build two 75-ton silos than one 150-ton.

To feed twenty cows at the rate of 40 lb. per day each, about 1½ in. would be removed from the surface of a 15-ft. diameter silo each day. Less than this is not advisable, as moulding would very likely take place.

Location of Silo.—This is not difficult to determine.

Different Types to be Considered.—French silos, which are not to be recommended and are only useful under exceptional circumstances, being liable to great waste.

Pit silos are good if ground is favourable, but must be free from moisture. The natural water level should be below bottom of silo, but there is not so much difficulty now as formerly, as waterproof Portland cements can be obtained which will ensure an absolutely dry pit.

Wood pit silos are of no use. Nothing but concrete or brick should be used in such positions, and even in rock excavation a cement face is advisable.

Brick is a useful material if made waterproof, and strengthened with bands of concrete.

The wood hoop silo is one of the best of its type, preferable to staves, as it is much stronger, and if care be taken in lining it the results may be very good. An excellent lining is cement on wire-netting, which should be tacked to the walls. The compo should be of 1½ sand to 1 cement, laid on about ½ in. or ¾ in. thick, screened in the usual way, and finished with the wood float. This makes a really good finish, especially if the cement is waterproof. A silo of this kind can be built for about £1 per ton in most localities.

The concrete silo is, however, *par excellence* the one to be recommended for permanency and utility above all others. It cannot be destroyed except with more trouble than to build it. The first cost is greater, but cheaper in the long run. If farmers could form groups and arrange for the erection of several within a given area, form a co-operative fund for the purpose, by each contributing his share, the cost of erection could be considerably reduced. Individual farmers cannot hope to personally erect these structures economically, as the equipment is expensive for one, but small when spread over a number, and men become expert at it with use. With a proper equipment, silos could be put up quickly in rotation, but it would not pay a contractor to go into a district with a plant to put up one small silo. The profit to which he would be justly entitled would be swallowed up very quickly in expenses, but if several were to be erected, that difficulty would largely be removed.

HIGHER PRICE FOR COTTON.

AMERICAN GROWERS ORGANISE.

The "Christian Science Monitor" publishes the following news from its correspondent at New Orleans, Louisiana:—

"Cotton clothing will be as expensive as silk as soon as the price-raising and crop-reducing programme, recently decided on at a meeting in New Orleans of representatives at every cotton-producing section of the United States is put into effect. The programme was unanimously adopted at the conclusion of the first cotton—acreage—reduction convention ever held, which agreed to reach the individual cotton farmer and compel him, by one means or another, to co-operate with the organisation.

"The action of this convention means that no cotton, either now or in the future, will be sold for less than thirty cents. (15d.) a pound, though it can be sold for as much more than that as the producer can get. It also means that the cotton acreage of the United States will be reduced by at least 33⅓ per cent. from that of 1917, thereby, through the law of supply and demand, forcing up the price to a point which will make cotton cloth nearly twice as expensive as it ever has been in the United States.

"Pledges were exacted from the representatives of all the cotton-growing sections not to sell any of the present crop for less than 30 cents. (15d.) a pound, and to store and hold every ounce of cotton until the demand calls for it at this figure, or more.

"State cotton—acreage—reduction committees were formed, whose business it is to obtain written pledges from every cotton-producer in all the cotton belt of the United States to reduce his acreage one-third under that of 1918, and to hold his present and future supply for a minimum price of 30 cents. (15d.).

"A resolution was adopted branding any man who refused to co-operate with the acreage reduction convention plans as 'so lacking in public spirit as to forfeit the confidence of the community in which he lives.'

"A future convention was called, though no place was named for it, before which a detailed report of the result of the plans formulated at this meeting will be received from each cotton-producing State.

"Ruffin G. Pleasant, Governor of Louisiana, presided at this meeting, and R. L. Manning, former Governor of South Carolina, chairman of the resolutions committee, presented the resolutions, which bid fair to tie up the consumer of cotton in a knot so far as prices are concerned. The resolutions were unanimously adopted, without discussion."

Looking back to the inception of cotton-growing in Queensland, growers of the present day have now the prospect of making a good thing out of cotton-growing.

The price of cotton in Queensland is ruled by the price of cotton in England. At the close of the Civil War in America, ginned cotton fell from 1s. 6d. to 2s. per lb. to as low as 4½d. During its continuance Queensland exported from 207,272 lb. in 1866 to 2,602,100 lb. in 1871. Farmers on almost all parts of the Southern coast grew small or large areas of cotton, selling at 3d. per lb., which, in those days, gave a handsome profit, and had anyone had the foresight to establish an oil mill, the 30,000,000 lb. of seed thrown away would have brought from £4 to £6 per ton, while there would have been 260,000 lb. of linters, lost for want of proper machinery. These two items alone would have produced £100,000, whilst the oil, at the then low price of £23 per ton, would have been worth over £50,000.

From the foregoing report on the action now taken by the cotton-growers of America, it is not very optimistic to conclude that the time is very near when there will be a great revival of the industry in this State. The Department of Agriculture has done everything presently possible to assist the cotton-growers, both by the free distribution of seed, and by undertaking to advance to them 2d. per lb. on all cotton delivered at the State ginnery. Furthermore, any profit derived from the sale of ginned cotton is divided amongst the suppliers *pro rata*, the only deduction being the actual cost of ginning, baling, &c. Last year, the farmers received 4½d. per lb. for their seed cotton. What does this mean to the grower? A medium crop of cotton amounts to 1,000 lb. At 4½ per lb. this is equal to £14 15s. per acre. But far higher yields have been obtained, ranging from 1,400 to 2,125 lb. per acre. These are incontrovertible facts. Now is the time to reap the benefit of conditions in America.

Late August and September are the earliest months during which to sow the seed, which farmers may obtain gratis from the Department of Agriculture. Given a fair start, then, should a drought occur, the cotton shrub will thrive, despite the want of rain, whilst most other annual crops fail to mature.

GROUND COTTON SEED.

ITS VALUE AS A STOCK FEED.

Not the least important feature of cotton-growing is the value of the cotton seed as a concentrate for balancing stock feeds. If cotton-growing develops satisfactorily, then the seed will be available in quantities which will render the extraction of the oil profitable. The residue from such an extraction ground into a meal is one of the finest concentrates for feeding dairy stock. Cotton-seed meal is somewhat superior to linseed meal in food values. It will, however, be some time before the cotton seed will be used for oil extraction; in the meantime, there is available the raw seed, and this, when ground or crushed, is a cattle feed of high value.

For the past three months ground cotton seed has been fed to the dairy stock at the Queensland Agricultural College and in quantities from 1 lb. to 3 lb. per head per day, the larger amounts being given to the cows in full milk. The results obtained have been satisfactory, and the ground seed, when it can be obtained, will certainly form portion of the ration for the College dairy stock in future.

In appearance ground cotton seed is not attractive. Adhering to the seed there is a small amount of lint, and after grinding the meal seems to contain a large amount of hairy fibre. The amount of this, however, is not great, nor has it any of the properties of hair. The cotton present is a vegetable fibre similar to the indigestible matter contained in all vegetable matter, and it has no bad effects on the animal. The flavour of cotton seed does not attract animals, and they may take a little time to get used to it. Once they get accustomed to it they eat it readily. Because cotton seed has a tendency to bind the animal, it should not be used in excessive quantities. Probably 5 lb. to 6 lb. per cow per day would be the greatest amount that should be used.

In order to obtain some idea of the comparative value of ground cotton seed the following grain rations have been run out:—

	No. 1.	No. 2.	Difference.
	lb.	lb.	lb.
Bran	194 ..	162 ..	32
Crushed Wheat	33 ..	28 ..	5
Crushed Maize	329 ..	63 ..	266
Linseed Meal	244 ..	153 ..	91
Ground Cotton Seed ..	— ..	394 ..	—

Each of these feeds is of equal value for milk production and would be used up to 1 lb. for each 3 lb. of milk given.

Thus, 394 lb. of ground cotton seed has the same value as the sum of the quantities shown in the third column above. If we take bran at ¾d. per lb., crushed wheat at 1d. per lb., crushed maize at 1d. per lb., and linseed meal at 1½d. per lb., the value of the cotton seed works out at about 1d. per lb., or, roughly, £9 per ton of 2,000 lb.

LUCERNE GROWING.

THE CROP THAT SAVED AMERICA.

By R. W. M. STEELE.

We have often heard it stated that the American farmer is "mad" on lucerne, or "alfalfa," as he calls it. We have also often heard it stated that alfalfa saved America. We do not hear, however, another statement which is also true: It was the application of science to lucerne-growing which saved America. We might with reason ask, "Will lucerne save Queensland?" I think it will, but we will have to apply science to its culture. Haphazard methods must go. On the Darling Downs lucerne is a widely grown, but little-cultivated, crop. Yet, generally speaking, we have the advantage over the American farmer, except where he uses irrigation. Firstly, we have not to fight the snow, as the States farmer has if he lives in certain of the States. Secondly, in the central-west, the States farmer has to contend with gophers and prairie dogs. These soon ruin a good stand of lucerne. Grasshoppers we sometimes get, but these are migratory; those with which the States farmer has to contend are not migratory, but breed and pass their lives on the alfalfa fields. We are not troubled to any great extent with that troublesome parasitical plant, dodder.

Notwithstanding these disadvantages the scientific methods employed have carried the States farmer through. The agricultural colleges have done great work in this respect. They have tested and proved the feeding value of lucerne. The States farmer knows just how to use it—

(1) For dairy cows (milk producing).
(2) For fattening steers (meat producing).
(3) For swine (bacon producing).
(4) For sheep (mutton and wool producing).
(5) For his working horses.
(6) For poultry (egg producing).
(7) And as a honey producer.

Each of these uses forms an essay in itself. The agricultural colleges have also taught the States farmer to get every ounce of "food value" out of his lucerne. The farmer knows what a "balance ration" is, and how to arrive at it. I wonder how many of our best farmers in Queensland are as well informed. Yet we have agricultural colleges and experimental farms. Food values are simple enough to be taught to any V.-class boy, in our State schools. Why should it not be done?

I would also like to point out that lucerne has saved the Argentine Republic, our great rival in the meat trade. Science was again brought into play. Foster Fraser, in his book "The Amazing Argentine," says:—"Give us of the best. Let us be up-to-date and scientific, so that the Argentine may have first place." This is the attitude of the Argentine towards agriculture. Can it be wondered that such a country is pushing us hard in the meat trade? C. P. Ogilvie, in "Argentine from a British Point of View," says:—"No business in Argentine has shown such good returns as cattle-breeding, and these results have been brought about by the introduction of alfalfa, and a knowledge of the life history of alfalfa is of greater interest to the cattle-farmer." The colleges have taught the States farmer scientific cultivation. Professor J. G. Haney says:—"It is demonstrated beyond doubt that alfalfa (lucerne) must have some cultivation to secure its best development. Statements of what it is possible to do for this plant with disc and harrow can hardly be believed

without demonstration. By means of cultivation alfalfa can be made to succeed in many places where it is now a pronounced failure. After the first year it will stand a great amount of surface disturbance. It should receive a thorough harrowing with a sharp harrow, the spring after seeding, or after each cutting. When two or three years old a disc harrow should be used.

Method of discing—

(1) Discs should be set nearly straight and weighted.
(2) Disc both ways.
(3) Discs are sometimes set at a slight angle to turn soil over. They must be weighted in order to "split the crowns."
(4) If stand is poor, discs are set at a greater angle, especially if grass is thick.
(5) Harrow down smooth.

Advantages—

(1) Discing destroys all surface roots, but does not destroy deep-rooted lucerne.
(2) Splitting crowns makes them throw out new shoots, invigorates growth, and thickens the stand.
(3) Discing makes an earth mulch over the field, and prevents the evaporation, which is so rapid in a newly cut field.

Results obtained by discing:—In an agricultural college in the States, dry year, rainfall (June, 1.19 in., July 4.51 in., August 2.84 in.), a field of lucerne received—

First discing, 28th March, yielded first cutting 31st May.
Second discing, 6th June, yielded second cutting 25th June.
Third discing, 27th June, yielded third cutting 13th August.
Fourth discing, 20th August, yielded fourth cutting 13th September.

This shows four discings and four cuttings of lucerne on upland in a dry year. This surely shows that discing and harrowing are of as much value to lucerne as cultivation is to maize. Would it not be a step in the right direction if these simple scientific methods, and the reasons for them, were taught in our State schools in agricultural and dairying districts? The experimental plots need only be small, but the value to the lad who is by and bye going to make "Australia great" would be inestimable.—"Daily Mail."

INCREASED YIELDS AS THE RESULT OF SWELLING SEEDS IN WATER.

Dr. Franklin Kidd and Dr. Cyril West, of the Imperial College of Science and Technology, lately communicated the following note to the "Journal of the Board of Agriculture," England, on the above subject:—

Much interest has been aroused recently amongst agriculturists as to the possibility of obtaining increased yields from seeds which have been submitted to treatments in which soaking in water or in salt solutions plays a part. It therefore seems appropriate to draw attention to this subject.

Some forty years ago two German agriculturists of repute—namely, C. Kraus and E. Wollny, showed that increased yields could be obtained by swelling seeds in water.

Their main conclusions may be summarised as follows:—

(1) In order to obtain the best results, the seeds must be swollen in the minimum amount of water necessary to saturate the seeds thoroughly. (If a large excess of water is used, the effect upon the subsequent growth and yield of the plants may be harmful.)
(2) The time of immersion should be sufficiently long for the seeds to become fully swollen.
(3) A subsequent re-drying of the seed does not appreciably alter the beneficial effect of the treatment, but the re-drying must not be carried out too rapidly.
(4) The percentage of germination is liable to be slightly decreased by the treatment.
(5) Swelling seeds in solutions of nutrient salts has much the same effect upon yield as swelling the seeds in pure water.
(6) All the seeds tested (*i.e.*, the chief cereals, and various other annuals of economic importance) gave the same result, with the exception of winter rye.

FARMERS' SHEEP AS PROFITABLE PETS.

By R. C. WILSON, Assistant Instructor in Sheep and Wool.

Amongst the large number of settlers following farming pursuits in Queensland, very few ever realise the value of a few sheep on the farm and the profits to be derived from this most useful of animals.

A very convincing and interesting article appeared in the "Live Stock Bulletin," by Mr. Munro Hull, detailing his experiment with sheep on a coastal farm. This gentleman is a progressive farmer, and deserves full credit for the way in which he proved, by actual results, the advantages of running a few sheep on every small farm.

In raising sheep for wool and mutton, outside of the other uses they can be put to, the farmer is producing articles for which there is a world-wide demand.

But until the farmer has had personal experience of the advantages and disadvantages of sheep, and the uses they can be put to, it is not necessary to start with a great number.

I would, for the start, advise that individual farmers procure, say, 10 to 25 sheep, which will run round the house, yards, &c., and do well, practically with the fowls. While so doing, the farmer could watch their habits and study them with a view of running a larger number with advantage to himself, and meanwhile procure such information on sheep as is supplied by the Department of Agriculture and Stock, particularly in reference to diseases sheep are subject to in Queensland, and how to recognise them. Queensland is free of most diseases affecting sheep in other parts of the world, and the few we have are easily dealt with.

It will be found that through having a few sheep on the farm, though very little trouble to care for, the children will take a keen interest in them, which will serve to improve their general knowledge of stock for the future benefit of both themselves and the country they take up when settling.

A particular feature about children and sheep is that I have often heard fathers refer to boys and girls of six to eight years of age, the question as to which lamb belonged to a particular ewe, when the answer would come, "That is Tommy; he is Jennie's lamb," or something to that effect, and they would always be right, too.

Keen interest is taken by most farmers' children in the lambs, all of which they have usually named, and know them apart, while to most of us grown-ups they all look alike and are just sheep or lambs.

The extra food values of a few sheep on the farm are not to be despised, and though one does not care to kill pets, what is better than fresh, choice mutton, fattened and killed on the farm, after eating nothing but beef or indifferent mutton supplied by local butchers after perhaps travelling great distances?

To run sheep successfully on the coast lands, one *must not* depend on the natural grasses. Though odd farmers may succeed under these conditions, it is certain that there would be a great many more failures.

Though they can be put to many uses, such as eating down weeds, scrub, &c., it is necessary, while so doing, to give them some fresh and green feed of an evening. Doing it in this way, the place will not be cleaned up so quickly, and the sheep will not suffer in consequence of being half starved.

Paspalum makes good grazing, but owing to its containing so much water and losing value by being frost-bitten, it is not so good for sheep as Rhodes grass.

Rhodes grass is a very valuable fodder for sheep, comparing favourably with lucerne, and though it suffers from frost, it is not destroyed, and green shoots will always be found near the ground.

Couch grass is also a useful grass for sheep. When grazing off lucerne, &c., sheep should never be turned in hungry, or there will be a large percentage of losses through hoven (otherwise bloat). They should be turned in with stomach fairly full for an hour in the evening, when they should be carefully watched and removed at once if any sign of trouble is noticed. The first sign is a slight swelling on the left side of the animal. When this apppears withdraw the sufferers at once.

Lucerne can be hand-fed well wilted, or half dry, with safety to sheep. In dry times they can be fed on a ration of 4lb. of ensilage per head, with such other dry feed as they can pick up.

Taking over a number of years and allowing for odd dry times, good scrub land under Rhodes grass will run three sheep to the acre. In some cases I have known up to ten sheep being run per acre on coast land, but that is looking for trouble, and unless the particular farmer has prepared for dry times by conserving fodder in the form of ensilage or hay, he will, some time or other, have a big smash and practically lose the lot.

At four sheep to the acre, and averaging per ewe at £1 (in that she has one lamb per year, value 14s., and will cut wool to the value of 6s.), these figures being net, a farmer would receive £80 per year for 80 good ewes running on 20 acres.

As some farmers' ewes have the ram with them all the year, the increase would be greater, but more attention would have to be given in care of ewes and lambs; also, a number of crossbred ewes have twin lambs, which would outbalance any ewes that did not lamb. In a small flock always together, few ewes ever miss taking the ram.

For the farmer, the most profitable sheep to breed is the crossbred, but as crossbred ewes are not always available, and are expensive to buy when wanted, it is advisable to procure a few sound merino ewes (plain-bodied Western ewes preferred) about four to six tooth, the bigger the better, and join them to a Border Leicester or Romney Marsh ram; this latter for coastal areas.

The Border Leicester is a good wool and mutton sheep, maturing early and suitable for high or fairly dry land, whilst where the ground is low or wet and having a heavy rainfall, the Romney Marsh is the best sheep, being hardier and more suited for that class of country. He also is a dual purpose sheep, maturing fairly early.

As an improver of soils and pastures, the sheep is right out in the lead. No doubt they pick out the choice feed in the paddock, but they also distribute the seed, manuring it at the same time, when it is only a matter of time and the difference in grass and feed will be noticeable to the most casual observer. There are places in Queensland where, on one side of the netting fence, cattle were run, and on the other side sheep, and as regards feed, the sheep side shows to great advantage over the coarse grasses on the cattle side. With sheep, as with all other stock, care must be exercised, as a pasture can be ruined by overstocking.

There are only two drawbacks that can honestly be brought against sheep on the coast, and they are dogs and internal parasites, such as stomach worms, &c.

Dealing with dogs: If a farmer has not netted in a run for the sheep, they must be yarded near the house every night, and if trained to it regularly for the first few weeks they will then go in of their own accord, and all that will be necessary to do will be to count them and shut the gate. Keep the salt box at the yards; that will attract them.

The internal parasites, &c., can be dealt with here in Queensland equally as well as they can in any other part of the world. They may be cleaned right out of a flock by drenching regularly and by the use of salt licks, which should be always available to the sheep. It is much better, on new country, to well drench the sheep before bringing them on to the property, and thereby save future trouble.

Where there are badly-infested sheep, the trouble is usually with the farmer himself, through, perhaps, inexperience or by putting off the drenching until losses occur. In some cases it is through the sheep not receiving sufficient nourishment to keep them healthy.

The wool from one to 1,500 sheep will be received by this Department, valued, classed, and sold in its various grades under one brand, D.A. in diamond, on account of farmer owners. Previous to wool being sold, an advance, if required, of 60 per cent. of the full value is allowed to the farmer on its arrival at the store. Should a farmer consider giving sheep a trial, he should avail himself of expert advice on breed, diseases, or any other information in management of sheep, which is supplied free on application to the Department of Agriculture and Stock.

VALUE OF RYE GRASS.

Mr. J. S. Clarke, Kuraby, writes as follows on this subject:—

Three years ago I sowed New Zealand oats, with which were mixed some seeds of Poverty Bay grass, and also of sorrel. Last year's drought killed the sorrel, but the rye grass survived and lived all through the winter and spring, stunted, but producing much seed. It is now flourishing, and spreading over the sandy loam land, looking a brilliant green, notwithstanding three hard frosts. This may be the same species reported as covering 2,000 acres in the Wimmera district, Victoria.

In any case it is, to my mind, a most important acquisition, being a fattening proposition which is urgently needed to supply stock with early spring feed not available from the native grasses. As the land on which this grass is growing was ploughed and cultivated twice in summer, the soil being very dry, no doubt the seed lay dormant until the rain came about March or April. It then germinated in the autumn, and came away when the weather was favourable, with good results. This grass should, in the future, enable growers to treble the stock-carrying capacity per acre.

To the dairying community it should be worth a fair trial. Poverty Bay rye grass seed is quoted in Sydney at 15s. per bushel for best quality.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
The Shorthorn Herd Book of Queensland;
The Jersey Herd Book of Queensland;
The Illawarra Herd Book of Queensland;
The Ayrshire Herd Book of Queensland;
The Milking Shorthorn Herd Book of Queensland;
The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
	DAIRY BREEDS.			
	AYRSHIRES.			
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	10	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
	JERSEYS.			
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoora	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, *viâ* Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book
	GUERNSEYS.			
Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
	DAIRY BREEDS—*continued.*			
	HOLSTEINS.			
Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman ..	"St. Athan," Wyreema	9	92	Do.
F. G. C. Gratton ..	"Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander ..	Glenlomond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Toogooloowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff ..	Inavale Stud Farm, Bunjgurgen, Q.	3	9	Do.
E. Swayne	West Plane Creek, Mackay	1	2	Do.
	ILLAWARRA.			
A. Pickels	Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny ..	3	62	Do.
	MILKING SHORTHORNS.			
P. Young	Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	Torran's Vale, Lanefield	1	9	Do.
W. Middleton	Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten ..	"Dunure," Miles ..	2	8	Do.
W. H. Francis ..	"Exelawn," Colinton, Brisbane Valley Line	3	5	Do.
	BEEF BREEDS.			
	SHORTHORNS.			
T. B. Murray-Prior ..	Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall ..	Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan ..	"Arubial," Condamine	3	6	Do.
W. B. Slade	E. Glengallan, Warwick	2	20	Do.
	HEREFORD.			
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
	SUSSEX.			
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

Poultry.

REPORT OF EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, JUNE, 1919.

The laying for the month in the light breed sections has been unsatisfactory, being as varied as the weather conditions, which have been of a regular wintry nature. The heavy breeds have, on the whole, done well, and some very fine laying has been done by individual pens. The best single score for the month by a Leghorn was made by Dixie Egg Plant's D bird, with 23 eggs. In Black Orpingtons, R. Holmes's E scored 28. A Plymouth Rock owned by the Kelvin Poultry Farm laid 25; A in both Ferguson's and Reilly's pens scored 24; and one of H. Puff's Rhode Island Reds laid 23 eggs. There were ten cases of broodiness in the heavy section, and one in the light section. The health of the birds has been good. One of C. H. Singer's birds died, and has been replaced. Two birds from W. Morrissey's pen were destroyed, and these also have been replaced. The following are the individual records:—

Competitors.	Breed.	June.	Total.
LIGHT BREEDS.			
*W. Hindes	White Leghorns	118	350
*J. M. Manson	Do.	126	343
*Dixie Egg Plant	Do.	111	333
*T. Fanning	Do.	123	310
*E. A. Smith	Do.	98	297
*Haden Poultry Farm	Do.	108	292
*Dr. E. C. Jennings	Do.	101	289
*G. W. Hindes	Do.	98	287
*Range Poultry Farm	Do.	90	277
S. McPherson	Do.	106	273
G. Williams	Do.	82	259
*C. P. Buchanan	Do.	86	258
G. J. Byrnes	Do.	89	256
*Quinn's Post Poultry Farm	Do.	97	254
*B. Caswell	Do.	87	251
J. H. Jones (Toowoomba)	Do.	60	244
*W. Becker	Do.	76	240
*H. Fraser	Do.	76	240
H. A. Jones (Orallo)	Do.	81	234
*W. Lyell	Do.	60	231
S. W. Rooney	Do.	73	227
W. A. Wilson	Do.	108	215
*Mrs. R. Hunter	Do.	68	211
*L. G. Innes	Do.	75	200

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	June.	Total.
LIGHT BREEDS—*continued.*			
Geo. Trapp	Do.	45	198
*J. J. Davies	Do.	106	191
*Mrs. L. Anderson	Do.	103	188
G. H. Kettle	Do.	94	182
Mrs. N. Charteris...	Do.	56	176
*Thos. Taylor	Do.	37	175
Oakleigh Poultry Farm	Do.	44	174
R. C. J. Turner	Do.	60	169
*Mrs. A. G. Kurth	Do.	68	166
B. Chester	Do.	48	163
C. A. Goos	Do.	79	157
H. O. Jones (Blackstone)	Do.	52	155
*O. W. J. Whitman	Do.	58	145
W. Morrissey	Do.	52	133
J. H. Dunbar	Anconas	66	123
J. W. Newton	White Leghorns ...	69	105
N. A. Singer	Do.	18	104
HEAVY BREEDS.			
*E. Holmes	Black Orpingtons ...	151	391
*E. M. Larsen	Do.	101	350
Geo. Nutt	Do.	122	344
*A. E. Walters	Do.	105	324
*R. Burns	Do.	115	317
*E. F. Dennis	Do.	136	313
*W. Smith	Do.	108	306
*A. Shanks	Do.	116	295
*D. Fulton...	Do.	125	293
*E. Morris	Do.	114	286
*Kelvin Poultry Farm	Plymouth Rocks ...	114	285
*Nobby Poultry Farm	Black Orpingtons ...	83	277
*Jas. Ferguson	Chinese Langshans ...	102	253
*H. Puff	Rhode Island Reds ...	104	235
*W. H. Reilly	Chinese Langshans ...	114	230
*T. Hindley	Black Orpingtons ...	89	220
Burleigh Pens	Do.	81	215
A. Homan	Do.	77	182
*T. B. Barber	Do.	82	176
*Mars Poultry Farm	Do.	68	168
C. H. Singer	Do.	67	166
R. B. Sparrow	Do.	45	136
*F. W. Leney	Do.	50	132
J. A. Cornwell	Do.	74	112
H. Ashworth	Do.	37	90
A. Gaydon	Do.	72	75
Total	...	5,704	15,246

* Indicates that the pen is engaged in single hen test.

RESULTS OF SINGLE HEN PENS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
W. Hindes	68	64	58	43	58	59	350
J. M. Manson	55	54	59	56	58	61	343
Dixie Egg Plant	53	55	61	66	50	48	333
T. Fanning	62	35	54	55	50	54	310
E. A. Smith	44	48	62	48	37	58	297
Haden Poultry Farm	57	56	55	47	35	42	292
Dr. Jennings	53	28	55	48	47	58	289
G. W. Hindes	58	27	59	51	42	50	287
Range Poultry Farm	24	49	58	65	32	49	277
C. P. Buchanan	29	56	44	34	41	54	258
Quinn's Post Poultry Farm ...	41	46	57	47	38	25	254
B. Caswell	32	12	43	61	61	42	251
W. Becker	66	48	58	32	0	36	240
H. Fraser	25	40	57	41	30	47	240
W. Lyell	24	54	53	48	25	27	231
Mrs. R. Hunter	28	51	39	37	31	25	211
L. G. Innes	13	47	15	42	43	40	200
J. J. Davies	22	18	39	41	44	27	191
Mrs. L. Anderson	38	53	16	16	26	39	188
Thos. Taylor	48	10	12	48	42	15	175
Mrs. A. G. Kurth	48	31	41	30	0	16	166
O. W. J. Whitman	20	50	18	12	23	22	145
HEAVY BREEDS							
E. Holmes	72	73	73	60	76	37	391
E. M. Larsen	62	68	47	42	69	62	350
A. E. Walters	53	57	67	52	35	60	324
R. Burns	52	53	56	74	36	46	317
E. F. Dennis	67	26	66	56	28	70	313
W. Smith	32	66	43	38	66	61	306
A. Shanks	23	24	67	66	50	65	295
D. Fulton	47	50	52	47	59	38	293
E. Morris	58	54	45	44	62	23	286
Kelvin Poultry Farm	72	34	38	38	54	49	285
Nobby Poultry Farm	39	35	39	56	56	52	277
Jas. Ferguson	53	56	35	37	30	42	253
H. Puff	54	10	41	58	40	32	235
W. H. Reilly	39	24	44	51	32	40	230
T. Hindley	61	48	0	47	33	31	220
T. B. Barber	17	37	31	33	32	26	176
Mars Poultry Farm	11	54	52	3	0	48	168
F. W. Leney	14	24	38	52	1	3	132

POULTRY EXPORT.

The Department of Agriculture and Stock has received from the Agent-General, through the Chief Secretary's Department, a letter from Messrs. Sproat and Co., of Smithfield, in reference to the export of poultry, and stating they are prepared to receive a consignment for testing the market.

The firm writes:—"Never before has such an opportunity presented itself for the inauguration and development of this industry, as Russia, the great competitor at this season, will be unable to regain her pre-war commercial standing (it is thought) for some years to come.

"The pre-war price for chickens and young fowls was about 10d. per lb., but that was in the days when large quantities of Russian were forthcoming, so that there will not be a reversion to pre-war rates for some years. The present prices (under Government control) are as follows:—

	Chickens and Fowls.	Turkeys.	Ducks.
	s. d.	s. d.	s. d.
To the wholesaler	1 10½ ..	1 10½ ..	1 8
To the retailer	2 2 ..	2 2 ..	1 10
To the consumer	2 8 ..	2 8 ..	2 3

"Our opinion is that, when the control is removed, prices may even go higher for a short period, ultimately coming down to about 1s. 6d. per lb., much depending on the quality and condition.

"Chickens (as packed by other importers)—twelve in a case. The outside measurement of the case being 2 feet 6 inches by 1 foot 6 inches by 4½ inches; thickness of wood used, 3.8 inches. If it would be an economy to pack twenty-four birds instead of twelve, there is no objection at this end. Failing to cover each fowl with thin grease-proof paper, cases should be lined with such. Please keep an eye on appearance.

"Observe uniformity in weight, so that each bird in a case may not vary from the other. Classification in quality must also be attended to—far better separate the best from the secondary bird. Better still, discard the latter, and don't send. When packing, allowance should be made for loss in weight in the process of freezing and transit, so that the buyer is assured that box-weight description represents fairly accurately the actual weight of the contents. Boxes should record on the outside the weights and contents, as for instance:—

Twelve chickens .. .. Gross.

"The same applies to turkeys and ducks; in fact, the contents of cases must always be described on the outside.

"All poultry should be starved twenty-four to thirty six hours before being killed, to allow for the complete assimilation of food, and in order that the gut may be cleared. After killing, the bird should be put into a chill room at about 40 deg. F., certainly not at a lower temperature. When thoroughly cool, they must then be graded, packed in boxes of twelve or twenty-four, then placed in freezer at a temperature of zero, until thoroughly frozen, when they can be stored at a temperature of 15 deg. F.

"The best selling chickens and fowls are those weighing from 2¾ to 4½ lb. each. Avoid sending those showing signs of spur. White Leghorns and breeds of similar size are useless. What is required is a chicken with a good breast and well fatted. If poultry is not mealy, though the desired weight, they will be rejected as secondary goods. All poultry should be 'bled.'"

Readers of the "Journal" may remember that in the year 1905 the Department forwarded a shipment of poultry to London, per s.s. "Damascus." In that market the prices obtained for the consignment were as follows:—Ducks, 2s. 6d. to 2s. 9d. each; best chickens and capons, 3s. 3d. each; turkeys, 7d. to 9d. per lb. Compared with prices then obtainable in Queensland, the London returns were very encouraging, in view of the fact that the ducks were not really as good as could be sent; that the chickens, although good, were not of a class that could be sent regularly, not having been bred specially for export, nor specially fattened; and that the turkeys were almost out of season.

The Department then announced that it was prepared to receive, during December, January, and February, chickens and ducklings for export to London, and full directions were given as to the class of birds required.

A second shipment was sent away by the steamer "Orient" in 1906, numbering about 300. The birds arrived in good condition and the packing, carried out in Brisbane by Mr. Fern, at that time Poultry Expert to the Department, was satisfactory. The London agent urged the importance of grading fowls and ducks. One or two fowls in a box might spoil the sale of the lot. If this were attended to, he considered that Australian goods properly put up would always command the market against American and Russian.

The latter country is now, and probably will be for some years, out of the market. Prices, as given by the Smithfield merchants, compare, notwithstanding the war, favourably with those ruling in 1905, and as the number of poultry farmers has of late greatly increased, there should be little difficulty in arranging a trial shipment in December next (should ship space be available), which would give time to poultrymen to prepare birds of the right class, such as buff orpington and wyandotte chickens. Black-legged fowls are stated not to be popular.

We do not, however, think that there is any likelihood of shipments of Queensland poultry to England, in view of the good prices obtained locally, even for inferior birds, without any cost to the farmer in the way of freights, preparing, and packing the poultry, &c. Added to this, poultry of all kinds are not as yet sufficiently numerous to allow of regular shipments. Ten years ago the Government Statistician set down the numbers of different fowls as follows:—

Fowls	652,411
Ducks	24,121
Geese	8,372
Turkeys	24,035
Other Fowls	1,379

The latest returns are—

Fowls	939,602
Ducks	53,916
Geese	7,240
Turkeys	21,041
Other fowls, including Guinea fowls	2,349

Fowls increased by 287,191; ducks, by 29,795; whilst geese decreased by 1,132, and turkeys by 2,994.

Of all classes of poultry, there are, in the State, 1,024,148 head. The population of Queensland numbers 700,342 persons; thus the number of fowls per person is 1.46.

In reference to the proposal to establish an export trade in Australian poultry, Sydney "Poultry" (28th June), whilst expressing some doubt as to the practicability of developing a profitable trade in the export of eggs from Australia to England, considers that there is apparently a good opportunity at the present time for the shippers of table poultry, chiefly by reason of the entire absence of Russian fowls from the London markets. In pre-war times the United Kingdom used to absorb enormous quantities of poultry from Russia, the supplies from that vast territory largely influencing prices, and it is considered by some authorities in England that very little poultry may be expected from either Russia or other Continental countries for a considerable time to come. In England, the average pre-war price obtained for chickens and fowls was about 10d. per lb. The present rates for poultry per lb., as controlled by the Government, are as follow:—

	To the Wholesaler.	*s.*	*d.*
Chickens		1	10½
Turkeys		1	10½
Ducks		1	8
	To the Retailer.		
Chickens		2	2
Turkeys		2	2
Ducks		1	10
	To the Consumer.		
Chickens		2	8
Turkeys		2	8
Ducks		2	3

These rates, despite their somewhat inflated character, will, it is believed, be maintained for some time after the control of prices is removed, but will ultimately come down to about 1s. 6d. per lb. to the wholesaler. That was the impression in London trade circles about two months ago, and is probably based on good information. On the other hand, we have lately read a good many reports of big supplies being available, both from Russia and other countries ravaged by the war, as soon as peace prevails and the resumption of trade is possible.

Meantime, of course, English poultry-raisers are enjoying a boom, which is also participated in by China and the United States, both countries sending big supplies to the United Kingdom. The Americans, with their accustomed keenness in exploiting promising markets, have gone to great pains in placing their products before the British public, the result being that a decided prejudice exists at present in favour of Uncle Sam's poultry, which are killed, graded, packed, and placed on the market in a manner leaving absolutely nothing to be desired. The Australian exporter is, therefore, up against keen competition, and must recognise that, even if the market

on the other side is receptive and the rates profitable, he must supply poultry of the highest quality only, and prepared and packed in a way that will commend the product to the exacting purchaser on the other side. If Australian poultry should unfortunately, through the blundering or slackness of the exporters, suffer by comparison with similar imports from America, or elsewhere, there would be but a poor prospect of anything like a considerable or profitable trade being developed between this country and the United Kingdom.

HINTS FOR AUGUST AND SEPTEMBER.

By J. BEARD, Poultry Instructor.

Without doubt, August and September are the busiest months in the year in the poultry business, for chickens should be plentiful, which tends to make any farm look lively, and provides plenty of work. This month is the time to hatch out birds of all the heavy varieties, and next month for all the light varieties for the early autumn laying, and they should be hatched out with all speed. From a commercial point of view, I have no time for chickens hatched in October or November, for it is simply a waste of capital and labour.

I know that many pens are not mated up at present. This should be done without delay, and after seven days the eggs should be fertile. Get these down with all speed, so as to have some chicks out early. The idea of not hatching because food is dear, or that sales will be slow in consequence, is incorrect and is not the right way of looking at things. Owing to the high price of red meat, table poultry are bringing high prices, and these are likely to continue for a considerable time.

With food at such high prices, there must be economy in its use, and while only the best should be used, care should be exercised in feeding. To get the best results from the birds, the proper ration must be given to supply enough nourishment and to make the eggs, otherwise there must be a loss. It is false economy to give a starvation diet which will only keep the birds alive, for then the egg basket is left empty, and there is no income from this source. For the morning feed, give a good mixture of soft food, and in the evening, good sound wheat, and where birds are on dry runs, or in intensive houses, let them have some green food at mid-day. Fowls so confined might have some soft food, but only in small quantities, or a little round wheat amongst the litter to keep them scratching, though occasionally a feed of maize may be given, but not in great quantity, as this will cause the birds to become internally fat. Just now this grain is very expensive, and at any time should not be given in large quantities, it being thrown down in the litter and buried, so that the birds have to work for it. The scratching provides exercise and reduces the fat, which would otherwise accumulate and stop the egg supply. Fat hens cannot possibly lay, and to get the most out of them they must be kept in a useful store condition.

Another essential thing is grit. So many birds fail to perform their proper functions through lack of the necessary means to masticate their food properly. The grit grinds it up and make it more easily digested. From this it will be seen that only sharp, hard grit is any good, because all soft stones soon loose their sharp edges, and at once become useless. Broken flints and crockery are best, and though they may cost a little more at first, they are by far the cheapest in the end, lasting much longer and being more effective in their operation.

When feeding breeding pens, see that all birds get their proportion of food. Sometimes the male will not feed with the hens, but will run round, calling them, without eating at all, and before many days are over is completely run down and useless for fertilising the eggs. This would account for many weak germs if only an examination were made. The male need not be fat, yet he requires a certain amount of food to keep him right, without which he cannot carry out his duties. If there is any doubt on this score, watch him when food is given, and if he will not eat eagerly, put him in a run alone and feed repeatedly, or just drive the hens into the house and give him an extra feed in the run after the ordinary meal has been supplied. The vitality of all breeding stock must be maintained, or the progeny will suffer in consequence.

See that all the breeding houses are properly ventilated and not over-crowded. Cold will not hurt fowls so much as wind and rain. Thus, while keeping them free from draughts, see that they are kept dry and get plenty of ventilation. If the front of the house is sheltered it may be left quite open, but there must not be any cracks at the back through which the wind can get in or blow between. Yet it is essential that the space between the top plate and the iron at the back of the fowl house should be left open to cause a top draught to enable the escape of any foul air that would otherwise accumulate.

THE MUSCOVY DUCK.

By R. T. G. CAREY, Beerwah.

REARING.

Upon this subject many country folks and town fanciers write me, "What is the best method to rear muscovy ducks?" To those I thus pen as follows:—

The greatest service in this work is rearing the stock from infancy to maturity. Whether it is to be for market, breeder, or exhibition, either branch requires the utmost care from the commencement. They must always have dry housing, as damp house proves fatal. The muscovy ducks do not perch or roost like fowls, but squat on the ground; therefore the camp must have a bedding of some dry grass, hay, or leaves laid down, so that their feet can be kept warm (that seems strange, but 'tis true; nothing gives cramps or muscular rheumatism quicker than damp floor and cold feet to these birds). The duckhouses or brooding quarters need not be of elaborate construction, but just sufficient space should be provided to accommodate the number desired in each quarter comfortably. Avoid overcrowding. Have the houses windtight with rainproof roofs, and leave the whole front open. A yard 30 ft. by 30 ft. is the most suitable.

When a batch of ducklings comes out, which usually is about in twenty days, drive the mother with her young to the brooding-quarters for about three or four weeks; then let them get on to range, where they'll gather natural food, such as insects, grubs, grass-seeds, and grit which they do enjoy. They like the freedom.

In fine weather and throughout the summer, it is very important that the ducks are let out to range early.

The artificial rearing is more intricate after incubation. You have to provide the heat to foster-mother; see that it is regulated, and when seeing to the lamp, perform any other duty that recommends itself just then. The most important items are warmth, cleanliness, fresh air, and judicious feeding, but "more brains than grains" is needed when feeding ducklings that are foster-mothered. After fourteen days to a month, separate the sexes. Rear and feed in the following manner:—Give just what can be eaten up clean of a nice mash of bread crumbs, bran and pollard, mixed moist with sour milk.

Water must be ever in front of them—but not sun-warmed. Always keep it in the shade, ever clean and fresh. Shade must either be natural or artificial for the muscovy duckling quarters, inasmuch as these young ducks do not feather on their backs, as do other fowls, until having prepared their breast, sides, and leg feathers. So the shading saves the thinly-covered backs from being scorched or scalded by the fierce sun's rays.

From the fifth or sixth week, muscovy ducklings should have a fair range to roam over, but not so large as will expand their force, necessitating their devouring more food to attain same results, by which time they have grown to full size.

Now a different system must be enforced. The frame thus built up must now be covered with flesh. Forthwith a period of semi-liberty or confinement comes into vogue, or a state of laziness encouraged. These ducklings, for market fattening, are now penned up, about twenty birds to each pen. The pens are usually 20 ft. by 30 ft. of roomy and lofty shed, with plenty of fresh air, well bedded with dried material, hay or leaves.

The quantity of food is gauged by their appetites (full and plenty), but avoid waste. In this stage no water must be supplied until they have finished eating. They are then brought on to the final stage, and afterwards marketed.

A NEW APPLE.

Victorian "Fruit World" (1st July) says that a new apple is quoted in English exchanges. The name is "Arthur Sheed," and the description is as follows:—

"Russet, suffused with golden and red colouring, medium to large in size, of superior quality for cooking or table use; season, October to March (or April to September, in Australia). The tree is a good grower, constant bearer, and very heavy cropper."

Particulars obtainable from Mr. Robert Holmes, Tuckswood Farm, Norwich, England.

Dairying.

FEEDING DAIRY COWS.

A cow may inherit the best of constitutions and milking capabilities, but the value of these will depend on the conditions under which she exists. Not only is it impossible for her to make something out of nothing, but her profit at the pail will be in proportion to the judgment exercised by her owner in those matters which directly affect her yield of the day or the season. Knowledge and care in feeding must accompany skill in breeding, or the latter will be of little service. A very large proportion of the food of the cow is grown on the farm, and of this, again, no small share is consumed in the growing state, or as green fodder, hay, or silage. Other foods, whether home-grown or imported on to the farm, properly take a second place in the inquiry. The pastures must first be considered, and we may briefly consider in what ways they may, in turn, affect the milk. The "land" and the "herbage" are commonly blamed for most failures in dairy work, the true causes of which are either unknown or inconvenient to confess, and it is certain that their influence has been greatly exaggerated. The soil itself—*i.e.*, the product of the rock—can only reach the milk by the soluble minerals which pass into it by way of the food and blood. The proportions of phosphate-making materials vary greatly in different plants, and somewhat, even in the same plants on different soils, according as these soils furnish them abundantly or in lesser quantities. There may be, therefore, an unexpected excess or deficiency of Ca salts in the milk brought from any pasture or from the hay made therefrom, and other foods—having all come from some soils may exert a similar influence in their various degrees. Milk so affected will behave differently in manufacture, and the subtle quality which rules its behaviour may be properly called "character." This, then, will vary with the soil; and it may be readily admitted that wherever the variations are not recognised, and an unchanging line of practice is blindly followed in the dairy, inferior and irregular results will follow. When, however, our eyes are once opened to the facts, and we are able to trace the influence of the soil on milk character, it is but a step to the possession of the knowledge which shall enable us to conquer the difficulty.

What the influence of the other alkaline salts may be is not yet fully known; but, so far as can be judged, it is, at most, small in comparison with that of the calcic phosphate, and covered in the dairy by simple changes in details of management.

When we turn to the herbage, we find other sources of difficulty awaiting us. The plants which may be considered good for feeding cows will give us no trouble; but these are commonly associated with others which are mischievous. The true grasses and leguminous plants may cause changes in milk quality by their many mixtures, proportions, and growth, but they will not interfere with the dairy processes, or give to the products ill qualities. The miscellaneous plants, which may all be considered weeds, include some which are dangerous to the health of the cow; others, more numerous, which flavour milk undesirably, and a few which colour milk, or produce irregularities. To these causes of mischief must be added those arising from plant diseases of a fungoid nature.

Do cows eat any appreciable proportion of such plants? The occasions known may be few in which the mischief is recognised, and traced to some particular plant; but such do occur often enough to make the matter one of importance, and a considerable amount of harm is done daily by such weeds as are incapable of giving a distinctly bad flavour to milk, but, in their many kinds, combine to give one generally inferior.

What is the cure? Clean pastures. If a weed is a pest in a cornfield, it is a much greater one in the case before us, where it not only takes the place of a better plant, but hinders the superior growths around it, but actually does direct damage to the dairyman's goods. There are few pastures which can keep sweet and free from such trouble by the mere force of natural conditions. Draining and manuring can do much in reducing the miscellaneous plants to small numbers, and the more innocent kinds, and a constant war against them should be maintained. Weeds are as harmful in hay as anywhere, and good hay can only be made from good pastures.

Silage is a valuable form of cattle food. It tends to increase milk, but unless well made from the best materials it will reduce the quality, and if badly made, should not be used for milking stock at all.

Cereals, whether fed green, in the ear, or fully ripened, as threshed grain or straw, are valuable in their various ways, and under proper conditions only affect milk by their variations in feeding value.

Certain succulent foods, such as cabbage, rape, turnips, swedes, mangolds, carrots, and parsnips are much employed in European countries and in America, and in reasonable quantities are useful as foods, but, with the exception of the two last, affect the flavour of milk, and its products in some degree, injuriously.

The same is true of brewers' grain and distillers' refuse. Meals and cakes of various kinds are much used, generally with more bulky foods, and with good effect on the quality of milk. The meals of peas and beans are in great favour with some feeders in Europe, while maizemeal is used for its fat, ranging from 4.5 to 5 per cent. Either will increase the quality of milk. Linseed meal has the same tendency, and is especially useful in feeding calves, while cotton seed is credited with an increase in butter production.

By-products of the milk, such as bran or wheat, &c., and the cakes made from pressing oil from linseed, are generally good for milking stock.—"Milk, Butter, and Cheese," by J. Oliver.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF JUNE, 1919, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING JUNE, 1919 AND 1918, FOR COMPARISON.

Divisions and Stations.	Average Rainfall.		Total Rainfall.		Divisions and Stations.	Average Rainfall.		Total Rainfall.	
	June.	No. of Years' Records.	June, 1919.	June, 1918		June.	No. of Years' Records.	June, 1919.	June, 1918.
North Coast.	In.		In.	In.	*South Coast*—continued:	In.		In.	In.
Atherton	1·61	18	1·28	0·19					
Cairns	2·76	37	2·21	0·38	Nambour	3·26	23	1·41	0·21
Cardwell	2·05	47	1·30	1·14	Nanango	1·91	37	0·70	0·28
Cooktown	2·03	43	1·47	1·33	Rockhampton ...	1·99	32	0·87	0·12
Herberton	0·96	32	0·81	0·05	Woodford	2·56	32	1·00	0·34
Ingham	2·39	27	0·28	1·05					
Innisfail	7·00	28	8·23	3·99					
Mossman	2·23	11	1·86	0·29					
Townsville	1·31	48	0·34	0·05	*Darling Downs.*				
					Dalby	1·62	49	0·07	0·25
Central Coast.					Emu Vale	1·35	23	0·02	0·29
					Jimbour	1·58	31	0·10	*nil*
Ayr	1·32	32	0·79	0·04	Miles	1·91	34	*nil*	0·05
Bowen	1·61	48	2·69	0·07	Stanthorpe ...	1·77	46	0·30	0·67
Charters Towers ...	1·40	37	0·20	0·01	Toowoomba ..	2·30	47	0·79	0·54
Mackay	2·70	48	1·61	2·04	Warwick	1·60	32	0·19	0·48
Proserpine	3·70	16	2·84	0·18					
St. Lawrence ...	2·48	48	0·83	0·70					
					Maranoa.				
South Coast.					Roma	1·65	45	0·70	0·02
Biggenden	1·83	20	0·04	0·05					
Bundaberg	2·74	36	0·13	0·02	*State Farms, &c.*				
Brisbane	2·56	68	0·78	0·20					
Childers	2·18	24	0·07	*nil*	Bungeworgorai ...	1·19	5	0·49	0·02
Crohamhurst ...	4·13	25	2·40	0·27	Gatton College ..	1·58	20	0·40	0·22
Esk	1·95	32	0·86	0·42	Gindie	1·59	19	0·09	*nil*
Gayndah	1·80	48	0·08	*nil*	Hermitage ...	1·85	13	0·11	0·91
Gympie	2·47	49	0·81	0·02	Kairi	0·70	5	1·27	0·13
Glasshouse M'tains	3·67	11	1·16	0·58	Sugar Experiment				
Kilkivan	1·93	40	0·56	*nil*	Station, Mackay	2·33	22	1·56	2·40
Maryborough ...	2·82	48	0·67	*nil*	Warren	1·33	5	0·15	0·28

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for June this year, and for the same period of 1918, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, State Meteorologist.

Horticulture.

GROWING STOCKS: OLD *v.* NEW SEED.

In the year 1765, an anonymous writer wrote as follows on Stock seed:—

"Many amateur and professional gardeners are certain that Stock (Giroflée) seed kept for five or more years give a larger percentage of doubles than fresher seed. Taking for granted that this is really a fact, the reason is that the seeds which can only produce single Stocks decay, losing their germinative power sooner than the others. So old seed will, in fact, produce fewer plants, but of the plants produced there will be a greater percentage of doubles."

How far can we now believe this statement made as long ago as 1765? According to traditional belief, it is better to use, for some vegetables and flowers, seeds from two to five years old. Why? Old gardeners say that new seeds produce plants less shapely, running more quickly to seed, and of such vigour, that they do not preserve all their true characteristics, while seeds two or three years old give more shapely plants, with less tendency to run to seed. It is possible to explain this? All plants, or, at least, most of them, have the power of reproducing themselves from seed, with their own characteristics, but, at the same time, they are influenced by atavism, which tries to make them revert to the specific types from which they came. Thus, in the seed of some varieties, two forces struggle, the one tending to make them revert to the primitive type, the other tending to reproduce certain acquired characters more or less fixed by selection. It is possible that this atavistic force weakens with the age of the seed, as also that abnormal vigour which makes certain plants run to seed if grown from seeds too fresh when sown. This is not the case with stocks. If we admit that double flowering of these plants is a weakness of degeneration, it is easily believed that seeds some years old no longer possess their pristine vigour, and can produce a double flower instead of a single. We have here a real transformation of the seed, a transformation which can be allowed if we remember that the less stocks are let run wild the more chance one has of obtaining double flowers. It is for this reason that stocks are grown in pots in Germany. In this way a much larger percentage of double flowers is obtained than in the case of plants grown in the open. Many growers prefer to use China Aster seed one or two years old, saying that by so doing they obtain more double flowers.

But above all, it is in the kitchen garden that it is necessary to know whether to choose young or old seed according to the species or variety. Thus, for beetroot and carrots, seed two years old should be used to let the root form better and keep the plants from running. For cabbages, three-year-old seed should be used, as then the plants will shoot and ripen better. If we do not wish to let spinach, lettuce, or radish run to seed, or differ from the type, we must use two-year-old seed. In the British "Good Gardener," gardeners are recommended to sow melon seeds several years old, and the same rule applies to cucumbers and all other *Cucurbitaceæ*.

The influence of time on the germinating value of seeds appears, then, to be a well established fact.

[Some years ago we sowed some broad beans. A portion of the seed was left over and forgotten for three years. These seeds were then sown, and the result was a splendid crop of beans, the haulms measuring 3 and 4 ft. in height.—ED.]

IMPORTANT ENGINEERING AMALGAMATION.

The fusion of the extensive engineering interests of Ruston, Proctor and Co., Limited, of Lincoln, England, and Richard Hornsby and Sons, Limited, of Grantham and Stockport, England, Melbourne, Sydney, and Brisbane, is announced. The amalgamation is a noteworthy one, embracing as it does two of the most important and well-known engineering firms in the world.

The works of Richard Hornsby and Sons, Limited were founded in 1815, and those of Ruston, Proctor and Co., Limited, in 1857. Both were commenced in a very small way, the first-named for the manufacture of agricultural implements, and the latter being a millwright's business. From their inception they progressed rapidly, developing into huge establishments, with factories occupying many acres of ground, and employing thousands of workpeople.

The "Hornsby" oil engine, so well known in Australia, was the first of its type in the field. In 1897 the gold medal of the Victorian Gold Mining Exhibition, held in Melbourne, was awarded to the "Hornsby" oil engine, and since then "Hornsby" engines have gained many high awards wherever exhibited throughout Australia, including gold medals at Bendigo and Warracknabeal.

"Ruston" engines and machinery are also very popular in Australia, their portable steam engines and threshing machinery being found in all parts of the Commonwealth, whilst excavating machinery of "Ruston" manufacture has been extensively imported.

During the war period the respective works at Lincoln, Grantham, and Stockport were adapted to the Empire's requirements, and their output of practically every class of war material reached colossal figures. The new firm proudly claims that they were represented by their work on every battle front, in the Grand Fleet, and in the air, and that they were tendered letters by the Imperial Authorities, complimenting them upon the outstanding character of their work, and also upon the phenomenal output of aircraft and aero-engines.

The new firm will in future be known as Ruston and Hornsby, Limited, with branches at 360-362 Queen street, Brisbane, Melbourne (Head Office for Australasia), and Sydney, and agencies exist throughout the Commonwealth and New Zealand.

DROUGHT PRECAUTIONS SCHEME.

A scheme, having for its object the prevention of practically all the usual losses in Queensland flocks and herds in times of drought, has been briefly outlined and submitted by Mr. P. J. Murphy to the United Graziers' Association of Queensland for the earnest consideration of that body.

The scheme, though extremely simple and brief, will, if carried into effect even in a modified form, have very far-reaching results, as it will not only set the pastoral industry on a sound and permanent basis, but will also create unlimited opportunities for profitable farming in all Queensland coastal districts.

Mr. Murphy states that the adoption of the scheme in some form is inevitable, as it is inconceivable that things should remain as they are for any length of time in Queensland.

The scheme provides for the storage of maize and trussed hay (such as wheaten hay) of the very best quality, and for a continuous standing guarantee of a profitable minimum price to the farmer for these two lines of farm produce. By "storage" is not meant the handing over of good farm produce to the rats, mice, and weevils, as happened to the Southern wheat in war time.

That means are now available by which maize and hay of the right quality may be safely stored for very prolonged periods has been proved beyond doubt—thanks to American brains—and that storing produce of the right quality is a financial success has been proved many times over, even by produce agents in the cities.

Mr. Murphy points out that under such a system, provided importation were stopped, the production of maize and hay of good quality would go on increasing indefinitely in Queensland; but there would never be a surplus, as the flocks and herds, as well as the number of pigs and poultry, would increase in proportion.

"Under our present system (or want of system) which is a very ancient and ridiculous one," says Mr. Murphy, "we have an apparent surplus of maize and hay in good seasons; the farmer is laughed at in the markets, and he cannot sell his produce, even at a loss. But the inevitable reaction results in a shortage next year, and then, to make matters worse, we try to kill the goose that lays the golden eggs—the farmer—by importing maize and hay; and then—perhaps the drought."

Finally, Mr. Murphy advocates the proper and scientific storage of immense and unlimited quantities of Queensland grown maize and hay in the vicinities of Brisbane, Rockhampton, and Townsville, and that those products should be handled mechanically in 10 or 20 ton parcels, and be available for despatch to any part of Queensland at an hour's notice.

This is evidently one of the greatest—if not the very greatest—post-war movements which this State can undertake, and the sooner something is done in this direction the better.

The Orchard.

GRAPE FRUIT.

CITRUS DECUMANA, LINN.

H. W. Mobsby, F.R.S.A., our Departmental Artist and Photographer, whilst on an official visit to Palmwoods with Inspector Sherry, visited an orchard belonging to Mr. P. G. Thelander, who said, approaching a tree bearing a type of citrus fruit in bunches: "Mr. Mobsby, you have had experience with the grape-fruit in California, U.S.A. Have a look at these," and after sampling, on Mr. Mobsby's telling him of the popularity of the fruit in America as a breakfast fruit, and how it ought to be made popular in Queensland, Mr. Thelander, who had thought of cutting out the tree, said he would let it stay where it was and take care of it, and also help to introduce it to the Queensland market more than it had been, so that the people might get the habit of eating the grape-fruit at breakfast, for there is no more appetising and system-toning food than ripe grape-fruit in its natural state, nor any more refreshing drink than that made with the juice of a ripe grape-fruit.

Health authorities agree that grape-fruit and oranges help sick people to get well, and those in good health to keep well.

An American journal, "Saturday Evening Post," says:—

"Domestic science experts join in commending the more liberal use of grape-fruit and oranges as a means of household economy.

"Miss Mary Arline Zurhorst, principal of the National School of Domestic Art and Science, says: 'We thoroughly endorse a more extensive use of citrus fruits, such as grape-fruit and oranges, by those interested in a pleasant road to perfect health and economy in spending household funds.'

"Mrs. Caroline L. Hunt, of the Home Economics Service, Department of Agriculture, says: 'Fruits like grape-fruit and oranges should be served to children in some form every day. They cost less and are really better than solid foods.'

"Dr. Wm. Gerry Morgan, the widely known stomach specialist, of Washington, D.C., says: 'Take grape-fruit at the beginning of breakfast to stimulate the appetite, and to help the stomach begin its work. Grape-fruit is the most valuable of all fruits for the majority of people.'"

The illustrations show—

1. The tree.
2. A bunch of eleven fruits.
3. The way to cut and serve the fruit for breakfast.

Mr. Morris, of Kew Gardens, who some years ago visited Jamaica, delivered an address, in which he spoke of the grape-fruit as follows:—"Amongst citrus fruits, there is no fruit which appears to be in greater demand and obtains such high prices as the grape-fruit. This is a variety of the shaddock or pomelow. It is so-called because it grows in clusters, as in a bunch of grapes. On account of its tonic properties it has lately come into great request in the American market. The most esteemed sort is of a good size, with a pale-yellow, polished rind. Grape-fruit should be allowed to get thoroughly ripe on the tree. Immature fruits are of an inferior flavour. The tree, when budded, is a vigorous grower and very prolific. It is recommended to bud either on the sour orange or rough-lemon stock. Provided the fruit is full-juiced and of a delicate flavour, the larger sizes are more in favour than the smaller ones."

In the sixties, the editor of this journal planted an orangery at Oxley Creek. The trees were imported from Sydney, and when they fruited amongst them was one tree which bore oranges in clusters, as depicted here. It was supplied under the name of the "cluster" orange. This was undoubtedly the first grape-fruit planted in Queensland.

In an early number of the "Journal" (1897), we published the following note on the value of the Grape-fruit:—

"Jamaica produces some kinds of oranges which, under the name of 'Paradise fruits' or 'Grape-fruits,' are sold at wonderful prices in New York. In 1896, the United States absorbed £20,000 worth of the Jamaica 'Grape-fruit' oranges. Two barrels were sold in New York at £5 each, and seven barrels of similar fruits sold in Philadelphia for £5 10s. each. These oranges would be retailed at about a dollar apiece (4s. 2d.). The most valuable orange in Australia has never approached such a value as this. The properties of the 'Grape-fruit' appear to be medicinal, as a tonic and febrifuge."

As far as is known, this class of orange has not been grown by Queensland orchardists, except in the cases abovementioned.

PLATE 4.—GRAPE FRUIT GROWN BY MR. P. G THELANDER, PALMWOODS.

Entomology.

INSECT PESTS OF THE ROSELLA.

THE ROSELLA FLEA-BEETLE.

(Nisotra breweri. Family.—*Chrysomelidæ.)*

By EDMUND JARVIS, Assistant State Entomologist.

The family Chrysomelidæ comprises a vast assemblage of small plant-eating beetles, usually found resting on leaves, the majority of which are brightly coloured, many species, indeed, being splendidly metallic and classed among the most beautiful of coleopterous insects.

Several of our Queensland chrysomelids are more or less injurious, such as pumpkin and potato beetles, to say nothing of various other kinds that injure the foliage of fruit trees, grape vines, sugar-cane, &c.

Flea-beetles, as the name implies, are of insignificant size, and further characterised by having their hind legs formed for leaping, the femora or thighs being very noticeably thickened to provide for this additional muscular energy.

The species under consideration furnishes another illustration of the trouble likely to arise when indigenous insects chance to acquire a decided taste for introduced plants.

In the present instance it is perhaps not surprising that this beetle should have found *Hibiscus sabdifera* more attractive than its own native food-plant, *Commersonia echinata,* Forst., since rosella leaves probably have a fruity flavour, and, being also more succulent than those of the latter species, would afford an abundant supply of moisture during very hot weather.

The Egg.—Although writing for the man on the land, it has been thought advisable to deal rather fully with the question of oviposition, as the knowledge obtained regarding the physical structure, number, and whereabouts of the eggs is of scientific value, and will enable growers to effectually control this pest by means of simple cultural methods.

The eggs are golden-yellow, elongate-ovate, measuring 0.90 by 0.30 mm., the chorion being somewhat coriaceous in texture and coarsely tuberculate (Fig. 5).

They are deposited in damp soil at a depth varying from $\frac{1}{4}$ to $\frac{1}{2}$ in., either singly or in batches of from two to eight.

In breeding cages, where the earth was moist throughout, single eggs were occasionally found on the surface, but even in such instances the majority (about 80 per cent.) were placed from $\frac{1}{8}$ to $\frac{3}{8}$ in. below ground level.

The female beetle crawls beneath the loose, dry, surface soil until reaching suitable damp conditions in which to oviposit, such action resulting after a time in the elytra becoming stained and otherwise disfigured.

A specimen, after laying 198 eggs in confinement, had its wing-cases nearly covered by a thin crust of hardened earth, upon which a white mould had started to grow.

This beetle, however, lived 34 days longer, laying 73 more eggs. (See table giving details of oviposition.

Eggs deposited under soil in cages hatched in from eight to ten days, but when kept on top screened from wind and exposed freely to the air commenced to shrivel after five days, and on the seventh collapsed, becoming flattened, although still retaining an oval outline.

They were killed by exposure to direct sunlight for about three hours at a temperature of 106 degrees Fahr. Individual female specimens captured outside oviposited freely when placed in cages.

A single example, however, will suffice as a record of the average number of eggs deposited every few days by one of these beetles.

The specimen in question may have oviposited prior to capture, so that the 271 eggs included in the table below perhaps falls short of the full number laid by a single flea-beetle under normal conditions.

EGGS OBTAINED FROM A SINGLE FLEA-BEETLE, CAPTURED 21ST MARCH.

April: Dates of Examination.						May: Dates of Examination.						Total No. of Days.
8	15	19	23	26	29	5	10	15	20	28	31	68
Number of Eggs in 40 days.						Number of Eggs in 28 days.						Total No. of Eggs.
65	40	37	20	18	18	35	3	27	5	3	0	271

It thus appears that during April this species deposits on an average thirty-three eggs every six and a-half days, or about five a day; while during the month of May, when the weather is decidedly cooler, the number is reduced to five eggs every forty-eight hours.

LARVAL STAGE.—The young larva a day or so before hatching is plainly visible as a bright yellow blotch at one end of the egg, the chorion surrounding the unoccupied portion showing distinctly whitish.

It emerges through a longitudinal rent in the side, leaving the empty shell practically unaltered in form.

Viewed with a lens of moderate power, these tiny larvæ may easily be observed crawling quickly among the particles of soil, and at this critical stage of life are doubtless, like many other species of the class INSECTA, endued with special powers of activity and endurance to enable them to locate suitable food.

Towards the end of the first moult the body is pale yellow, the head, prothoracic, and anal plates darker, and with a series of transverse elongate, dull-fulvous blotches on all other body segments.

Anal plate and proleg large, the outer angle of former rounded, the borders blackish, emarginate, edged with six long dorsal hairs.

Subdorsal tubercles and dorsal blotches supporting short white glandular hairs. Length, at this stage, 3.50 mm. (Fig. 10).

Just prior to pupation the fully grown larva, which measures about a-quarter of an inch, contracts, until about 5 mm. in length, assuming a bloated cylindrical form.

The anal-plate is then distinctly narrower than the diameter of the body, and the proleg unobtrusive.

The general colour at this stage is a uniform dirty white, the head reddish-yellow.

From the time it starts feeding, but more particularly during the last stadium, it has a habit of doubling up hook-like when alarmed and remaining rigid and motionless for several seconds.

THE PUPA.—General colour creamy-white; anal segment tipped with two spines; body supporting a few scattered hairs as shown in Fig. 9.

A day or so before transforming into the imago the wing-cases change to smoky brown, the eyes from brown to black, while the shape of the mandibular teeth appear in distinct reddish outline.

Transformation is complete about a couple of days later, the elytra being at first pale yellow with pearly lustre, but after a few hours darkening to steely-blue.

THE BEETLE.—Body ovate, dark, shining, steely-blue; thorax, scutellum, legs, and antennal joints 1 to 5 light reddish-yellow.

Ventral surface of abdomen and metathorax reddish-black. Eyes, and joints 6 to 11 of antennæ blackish, the latter gradually thickened towards the tips (Fig. 8).

Mandibles yellow, each composed of two large lateral teeth and three small ones (Fig. 3); labrum rectangular; labium narrow, elongate; maxillæ small, lacinia spinescent; (Figs. 7, 6, 4, respectively).

Elytra (wing-covers) with about 16 longitudinal carinations (observable only under a strong lens by reflected light), the intermediate spaces between them irregularly and more deeply punctulate than the pronotum. Marginal edges of elytra and pronotum slightly flattened horizontally. Pulvilli of tarsi clothed with white hairs.

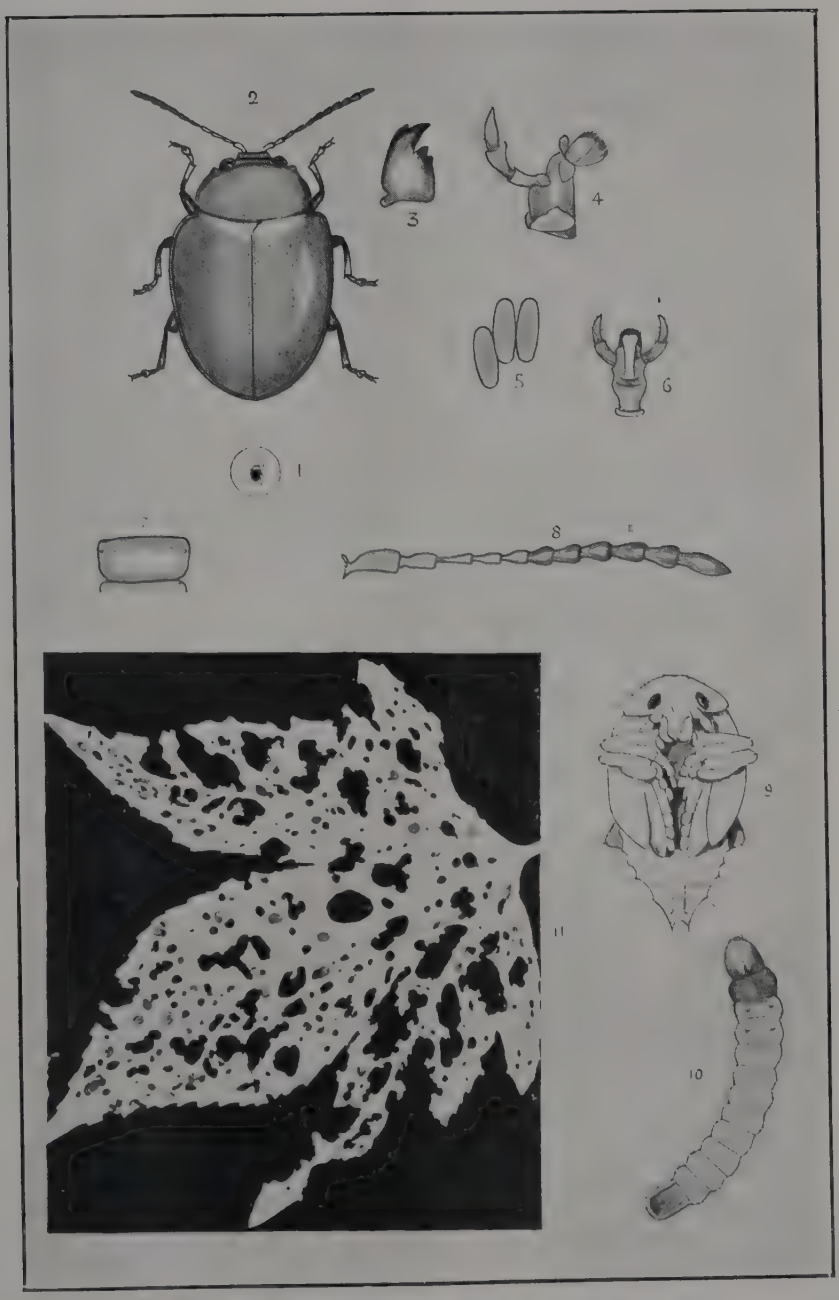


Plate 5.—Rosella Flea-Beetle (*Nisotra breweri*).

1. Beetle (natural size). 2. Beetle (enlarged 12 times). 3. Mandible.
4. Maxilla. 5. Eggs. 6. Labium, or lower lip. 7. Labrum, upper lip.
8. Antenna. 9. Pupa. 10. Larva (all the above figures much enlarged).
11. Rosella leaf (natural size) damaged by *Nisotra breweri* and other beetles.

(All drawings original.)

Length and width of female 3.60 by 2.50 mm. (Fig. 1 natural size).

Habits of Adult Beetle.—During copulation the female of this species, whilst carrying the male and crawling on leaves, has a curious habit of wagging its body from left to right in a lively manner for several seconds.

Mated pairs confined in breeding-cages were noticed copulating again after intervals of one and ten days, so probably this species mates several times during the period of oviposition.

NATURE OF INJURY.—The accompanying photo. of a rosella leaf damaged by *Nisotra breweri* (Fig. 11) may be taken as a fair illustration of Flea-beetle attack. The large holes, &c., are the work of other beetles and caterpillars, the small ones being for the most part caused by the species under consideration.

In addition, however, to leaf injury, this pest sometimes materially checks plant growth by devouring the tender bark of young shoots, destroying at times areas sufficiently extensive to nearly girdle the stems. Wherever the bark or epidermis is eaten in this way the place turns brown, and similarly holes in the leaves become margined with a ring of dead tissue which renders them very conspicuous.

Both larvæ and pupæ were found in the soil close to the stems of affected plants, so in all probability subsist for the most part on the fibrous feeding-roots.

Although specimens confined in cages tunnelled and consumed the central portions of various succulent roots about ¼ in. in diameter, brief examination of affected rosella bushes failed to reveal larvæ inside the larger roots.

It should be mentioned that in the wet season, when injuries to the bark and leaves caused by this beetle do not heal readily, affected bushes may suffer from fungus diseases, which flourish during damp humid weather, and are liable to invade the tissue of plants that, whilst trying to develop a large crop of fruit, are at the same time incurring loss of vitality from attacks of insect pests.

REMEDIAL MEASURES.—Like most flea-beetles, this species leaps with agility from the leaves to the ground if touched, and remains motionless until believing the danger past.

Fortunately, it does not take fright when closely approached, so that in the event of severe infestation the control method of shaking badly affected bushes over suitable tarred screens would prove very serviceable.

Upon the first appearance of this pest in large numbers the ground around the plants should be hoed at intervals to a depth of about 2 in., either with a small "Planet Junior" or preferably with ordinary Dutch hoes, as by using the latter treading on the freshly hoed surface is avoided.

Such treatment, in addition to killing weeds and conserving moisture, would probably cause a large percentage of the eggs to dry up, and, moreover, by loosening the soil particles, enable *Pheidole megacephala* and other ants to more easily reach and destroy both eggs and young larvæ.

P. megacephala doubtless operates at times as an important controlling factor in this connection, since these ants were found nesting in the soil about the main roots of nearly every rosella bush examined, having probably been attracted in the first instance by the supply of food in the shape of eggs, larvæ, and pupæ of *Nisotra breweri*.

Other remedies consist in dusting the plants at intervals, when the beetles are plentiful, with arsenicals, such as arsenate of lead mixed with an equal proportion of air-slacked lime, or spraying with vegetable insecticides, as decoctions of aloes, hellebore, &c.

CULTURAL METHODS.—*Hibiscus sabdarifa*, known in Jamaica as "Sorrel" or "Roselle," and belonging to the family *Malvaceæ*, is extensively grown in many tropical and subtropical countries, the fruit being usually considered a welcome addition to the table, owing to its distinctive sub-acid flavour.

From time to time our Editor has pointed out the advantages likely to be derived from a cultivation of this crop, and readers wishing to obtain full information on the subject are accordingly referred to the "Queensland Agricultural Journal" (Vol. VI., p. 371).

Whilst dealing principally with the entomological side of the question a few personal observations on the cultivation and rapid growth of rosellas in North Queensland may interest general readers.

A small sowing was made on 28th December on light-red volcanic soil of medium quality, ploughed for the first time the previous season. This patch had been planted with English potatoes, which failed to produce a good crop, owing to want of rain.

No manure was given, and after digging the potatoes the land was simply chipped over to a depth of about 4 in., levelled, and the seeds sown in drills.

The young plants were thinned to 9 in. apart, and by the middle of February had made bushes 18 in. high.

During this interval of seven weeks from date of sowing the weather was very hot, and one hoeing was given to kill weeds.

At the end of February the bushes were thinned to 4 ft., and heavy rain fell, succeeded by three weeks of intense heat.

The infestation by *Nisotra breweri* started in January, and doubtless had the effect of stunting plant growth, as every leaf was riddled with holes, and the beetles continued to feed unchecked throughout February and March. By 1st April, however, the plants were 3 to 4 ft. high and covered with flower buds which bloomed freely a couple of weeks later, and by the end of April (only four months from date of sowing) every bush was loaded with fruit.

Thinnings that had been transplanted in February suffered considerably at first from flea-beetle attack, but shortly after cultivation of the surface this pest was less in evidence, although present in fair numbers on the bushes until the middle of May.

ADDITIONAL INSECT PESTS OF THE ROSELLA.

Apparently the various insects known to affect this plant in Queensland are of minor importance.

In the south, near Brisbane, an aphis and one or more kinds of sap-sucking bugs are commonly met with on the fruit and young leaves, but do not, as a rule, occasion noticeable injury.

Nisotra breweri is the only really destructive insect encountered by the author in North Queensland up to the present, although the following species also occur more or less harmfully on the foliage of rosellas at Meringa:—

Lagris cyanea, Macl. (Order *Coleoptera;* Family *Lagriidae.*)

Specimens of this beetle were observed to be constantly present on rosella bushes, eating holes in the leaves.

It is a beautiful insect, about five-sixteenths of an inch long, of a uniform shining peacock-blue or bronze colour, tinged with iridescent purple, roughly punctured, and sparingly clothed above with short white hairs. The head and thorax are of about equal width but proportionately much smaller and narrower than the rest of the body.

Antennæ yellow, with joints 7 to 11 blackish. Legs red, tarsi, basal half of tibiæ, and distal ends of femora black.

This beetle occurs freely throughout forest country around Cairns on a variety of native plants, but at present does little or no damage to cultivated crops.

Rhyparida discopunctulata, Lea. (Order *Coleoptera;* Family *Chrysomelidae.*)

A shining brownish-black hemispherical beetle, about three-sixteenths of an inch in length, with parallel rows of coarse punctures along the wing-cases, and smaller punctures scattered over the pronotum. Eyes black; antennæ reddish-yellow.

Myriads of this excessively common chrysomelid may be seen during spring and early summer resting on the flower stalks of *Chrysopogon aciculatus,* the so-called "grass seed" or "Mackie's Pest."

The beetles are somewhat gregarious in habit, and probably subsist on several different plants.

They usually hide among and injure the young leaves, but do not occur freely on the rosella.

This species, and *Lagris cyanea,* are abundant and widely distributed, and owing to their varied dietary may in the future acquire a liking for economic plants.

Euproctis sp. (Order *Lepidoptera;* Family *Lymantriidae.*)

During March many small caterpillars of this moth were found injuring the young foliage and eating large holes in older leaves.

Being chiefly in one place and at the end of a row adjoining forest land, they may have originated from a batch of eggs that had not been deposited on a rosella bush.

These caterpillars were bred to maturity, but details regarding their metamorphosis need not be given here.

The larva is velvety brownish-black, with dorsal series of dull yellow tubercles tufted with brown hairs and sprinkled with white.

Two scarlet stripes are present on segments 3 to 7, and two shining coral-red osmeteria on 6 and 7. Length about $\frac{5}{8}$ in.

The pupa is enclosed in a light-brown papery cocoon spun between leaves of the food-plant, or on the ground under fallen leaves.

The moth, which measures about $\frac{3}{4}$ in. in expanse, is pale cream colour with a few scattered brown and yellow scales on the wings. Eyes large and black; antennæ bipectinate.

Hind margin of abdominal segments and anal tuft yellow.

PLANT-BUG. (*Dysdercus* sp. Family *Pyrrhocoridae*).

Invariably present on rosella bushes in small numbers.

Description.—Head, prothorax, and basal of hemelytra (wing-covers) white. Anterior margin of prothorax white, bordered behind dorsally by a broad blackish raised band, not reaching outer edges.

Scutellum, apical portion of wing covers, and a large spot on basal half of same, black. Wings smoky-grey.

Beneath.—Reddish-black; hind borders of all body segments white.

Eyes, antennæ, and legs black, with exception of first antennal joint, coxæ, and trochanter, which are red. Beak red to middle coxæ; terminal portion black, reaching hind edge of first abdominal segment.

This is a slender insect about $\frac{5}{8}$ by $\frac{1}{8}$ in. in size.

PLANT-BUG. (*Agonoscelis rutilia*, Fabr. Family *Pentatomidae*.)

Occurs sparingly on rosella bushes. Its usual food-plant is one of our common weeds.

Description.—Black; with brick-red banding arranged as follows:—Above—A cross on pronotum, margins of same and of head, scutellum, and tegmina. Below—Outer borders of body and hind borders of thoracic and abdominal segments.

Size, nearly half an inch long. (10 by 5 mm.)

May, 1919.

THE USEFUL LEMON.

The lemon has many uses in the sick room, the kitchen, and the house. The juice from half a lemon in half a glass of water before breakfast will correct the most torpid liver and prevent bilious troubles. For hoarseness, lemon and sugar will prove helpful and pleasant to take, and will cure sore throat when used as a gargle. In fever, the lemon is cooling and of great value for moistening the lips and cleansing the tongue. Two or three slices of lemon in a cup of strong, hot tea will often cure a nervous headache, and refresh the mind and body. A spoonful of lemon juice in a cup of black coffee frequently will cure bilious headache. An outward application of lemon will allay irritation caused by insect bites. If a teaspoonful of lemon juice is added to boiling rice or sago, the kernels will be whiter and have a more delicate flavour. Tough meat is made less tough by adding a teaspoonful of lemon juice to the water in which it is boiled. Use slices of lemon to garnish fish and game of all descriptions. Lemon juice with olive oil instead of vinegar is preferred by many for salad dressings. After the pulp has been removed, the skins of lemons may be used as receptacles for serving salads or lemon ice. Lemon ice is one of the cheapest, most healthful, and refreshing desserts for summer. Lemonade should be made the national drink, and is greatly improved when the well-beaten white of an egg is added. Iced tea is improved in flavour and made less constipating by the use of lemons. After the juice has been extracted, the rind dipped in salt will clean tarnished brass. Salt and lemon juice will remove rust, ink, or fruit stains from white goods. Lemon juice removes stains of all kinds from the hands, and prevents roughness and chapping. Lemon juice and rosewater, equal parts, will remove tan and whiten and soften the skin. A dash of lemon juice in water makes a cleansing tooth wash, removes tartar, sweetens the breath, and hardens the gums. Dried lemon peels sprinkled over coals will kill disagreeable odours. A cloth soaked in lemon juice and bound around a cut stops severe bleeding until medical aid can be secured.—"Philippine Farmer," Vol. V., No. 2, in the "Tropical Agriculturist."

Botany.

MISCELLANEOUS BOTANICAL NOTES.

By C. T. WHITE, Government Botanist.

(A) NOTES ON A FEW NATIVE PLANTS.

Vigna lanceolata, R.Br.

In this Journal for July, 1918, attention was drawn to the subterranean fruiting of the above plant. In his "Contributions to the Flora of Queensland" (1880), P. A. O'Shanesy had already briefly mentioned this peculiar habit, stating "The yellow-flowered twiner *Vigna lanceolata* produces little nuts, generally of two articles, but much smaller than those of *Arachis hypogaea* or Earth Nut, from the flowers of underground stems."

Solanum torvum, Sw. Devil's Fig.

I find, on examination, that the weed known in Queensland as Devil's Fig, and named as a new species in this Journal under the name *S. largiflorum**, is identical with the very widely distributed tropical *S. torvum*.

Lomatia silaifolia, R. Br.

Since the article on the above plant in this Journal for June, 1919, appeared, in addition to the records referred to on the poisonous nature of the flowers, my attention has been drawn to a note on the subject by J. H. Maiden in the "Agricultural Gazette" of New South Wales for February, 1917 (Vol. XXVIII., p. 130). In this Mr. Maiden quotes several correspondents, who state that numbers of dead flies and mosquitoes were found round vases in which branches of Lomatia flowers had been placed.

(B) RECORDS OF A FEW ALIEN PLANTS.**

Brassica juncea, Hk. & T. Indian Mustard (Order Cruciferæ).

A tall, erect-branching annual, root slender, tapering. Lower leaves petiolate, lyrate, lobes toothed, upper leaves lanceolate. Flowers, at first in short corymbs, afterwards lengthening out into racemes as the pods develop. Pods 2-valved, beaked, including the beak 1½ in. long, beak ¼ in., valves prominently veined. Seeds small, brown, rugose.

Hab. A common weed on farms on Nerang River (known locally as "Chinese Cabbage"), C. T. White; about Brisbane, C. T. White; Yarrabah, near Cairns (a weed in cultivation plots), Rev. N. Michael. This Indian and Chinese plant has been naturalised, or semi-naturalised, in Queensland for some years.

Oxalis cernua, Thunb. Soursob. (Order Geraniaceæ).

Stemless or almost so, rootstock fleshy, producing bulblets and tubers. Leaves, all radical, very long-stalked, of 3 obcordate leaflets. Flowers, yellow, rather large, at first erect, afterwards drooping, 3-16 in the umbel.

This South African species, sometimes cultivated as a garden plant, is not uncommonly seen as a stray. Recently, Mrs. R. Higgins gathered specimens in an old "Staghorn" clump in the bush at Mount Crosby, and Mr. C. F. Wood, Kelvin Grove, near Brisbane, brought in specimens as a common weed in cultivation plots.

In the Southern States it is a troublesome weed, holding much the same position there that *Oxalis corymbosa* does here. It is not, however, at all likely that it will ever prove a great nuisance in Queensland.

Zephyranthes carinata, Herb. (Order Amaryllideæ).

Bulb ovoid, 1 in. diam. Leaves linear, 6 in. to 1 ft. long, 3-4 lines broad. Peduncle, 6-9 in. long. Flowers bright rose-red, 2½ in. to 3 in. long; styles deeply 3-lobed.

This West Indian and Mexican plant is quite naturalised in many places in Southern Queensland; it is quite common in grass land about Brisbane, and I have had specimens from as far North as Yeppoon (Coll. W. T. Bick). It has been suspected of causing losses amongst stock.

Zebrina pendula, Schnizl. (Order Commelynaceæ).

Met with a stray from garden culture on the Blackall Range. It is a native of Mexico and commonly cultivated in gardens, especially in rockeries and bush-houses.

---

* *S. largiflorum*, C.T.W., "Queensland Agricultural Journal," Vol. 8, new series, p. 170, pl. 122, and Botany Bulletin XX., Department of Agriculture and Stock, p. 16.

** See also "Queensland Agricultural Journal," Vol. VIII., new series, pp. 269-270; Vol. IX., new series, p. 228.

General Notes.

THE QUEENSLAND WOOLLEN MANUFACTURING COMPANY

In the issue of the "Queensland Agricultural Journal" for July last, a manifest error occurred in our remarks on the cotton industry in Queensland, in that the Ipswich Woollen Manufactory is mentioned as having "closed down." The word "woollen" was erroneously printed for "cotton." The Ipswich Woollen Manufactory, so far from having closed down, is carrying on an uninterrupted, successful business. We regret that the error was overlooked when the proof sheets were revised.

We have now received the following information regarding the present position of the Queensland Woollen Manufacturing Company from the chairman of directors:—

"The company never closed down, and our sixty-second meeting of shareholders takes place on the 18th August next, when a record balance-sheet (in every way) will be presented to the shareholders.

"The figures speak for themselves, and I will give you the results of last four years' working, and send you a balance-sheet for 1919 when issued at the end of this month. I think it only fair for you to publish same in your August "Journal."

MANUFACTURING ACCOUNT.

YEAR 1915.

(From 1st July, 1914, to 30th June, 1915.)

	£	s.	d.
Expenses (including Wages £9,456, and Wool £18,604) ..	30,580	13	10
Sales	46,116	0	7

1915 Dividend—10 per cent.

YEAR 1916.

Expenses (including Wages £13,424, and Wool £30,103) ..	48,715	1	2
Sales	68,133	17	4

1916 Dividend—20 per cent.

YEAR 1917.

Expenses (including Wages £12,103, and Wool £31,787) ..			
Sales	51,425	16	7

1917 Dividend—10 per cent.

YEAR 1918.

Expenses (including Wages £10,527, and Wool £20,366) ..			
Sales	50,144	17	11

1918 Dividend—10 per cent.

"In the year 1916 the mill was working night and day for some months with three shifts. During the four years nearly the whole of the output was commandeered for the Commonwealth soldiers' material. Our sales for 1919 have reached the record output of £75,680 odd, which, I think, speaks for itself as to the flourishing condition of the company and the benefit to Queensland.

"As your journal goes to almost all parts of Queensland, and many of our shareholders read it, the paragraph will come as a shock to them. The secretary has had already several inquiries as to correctness of the paragraph so far as our mill is concerned, even one from Maryborough.

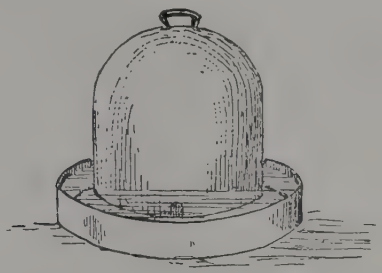
"As to the prospects of other mills, I am a believer that there is room for them, and the day will come when Australia will be exporting all kinds of woollen manufactures. And why should we not do so? We have the raw material and all necessary requirements in the way of coal, water, and man, woman, girl, and boy labour.

"I think you have confused our firm with the Cotton Company, which closed down years ago for the want of the raw material—cotton. I may add that the old cotton mills are now flourishing woollen mills, so that we have two woollen companies in our city, and both flourishing, employing nearly 300 hands.

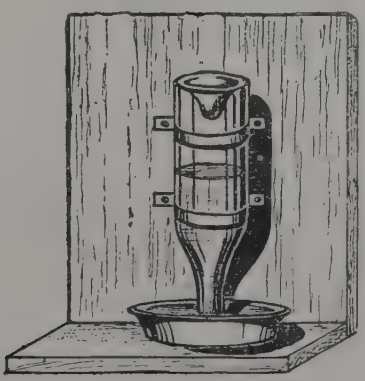
"GEO. R. WILSON,
"Chairman of Directors,
"Queensland Woollen Company, Ipswich."

COOL WATER FOR FOWLS.

In a former number of the "Journal" we described and illustrated a drinking-fountain for fowls, by which a constant supply of fresh water is kept up. This consists of a zinc dome with a square hole cut near the bottom edge. This dome is filled with water and set on a zinc trough. The water runs out of the hole at the bottom of the trough, and remains at a depth equal to the height of the hole from the bottom. As the fowls drink, the water continues to run, and so keeps up a supply without overflowing.



A still simpler contrivance is a common beer bottle. Make a stand for it out of two pieces of wood—one horizontal, the other perpendicular. To the perpendicular piece attach two wires to hold the bottle in position. Then put a soup plate in a dish full of water on the horizontal board. Fill the bottle, cork it, then invert it over the dish. Take out the cork, being careful that the mouth of the bottle touches the surface of the water. There will be a supply kept up as long as there is water in the bottle.



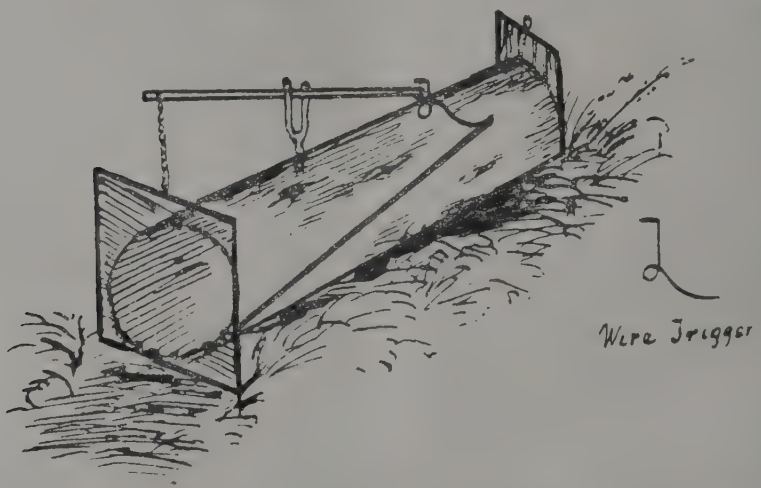
THINNING PEACHES.

Peaches are now coming into fruit, and the question "To thin or not to thin" will arise. It is an undoubted fact that thinning the young fruit greatly improves the quality and size. Now, if a fruitgrower can improve the quality, size, and colour of his fruit, whatever it may be, by thinning it out when young, he realises by future sales far more on the lesser number of superior fruit than he would on the larger quantity of inferior fruit. He has less labour in picking, less to pack, less to cart to market and pay freight on, but he has a larger profit to make than if he allowed nature to have her way with the crop. As to when peaches should be thinned, it should be done when the fruit is the size of a marble. Some say, "Thin when the fruit is as large as the stone will be in the ripe fruit," which is the same thing in other words. In all operations with fruit and fruit trees, note must be taken of the season, whether wet or dry, also of the tree, whether it is in good, healthy, or poor

condition. The former can carry a great deal more fruit than the latter, for the reason that the healthy tree has probably had given to it, or has discovered, some good fertiliser which will help it to bear a heavy crop. It is a good practice to leave a distance of 6 or 7 inches between each fruit.

A BANDICOOT TRAP.

Of the making of traps and "spryngs" there is no end, but, like "bunny" in the West, the bandicoot laughs at all attempts to keep him in subjection. Have any of our readers even tasted roast, boiled, or stewed bandicoot? If not, catch one and try it. The flesh is delicately white and tender, and the flavour somewhat like that of a sucking-pig. For cooking purposes, the animal must be plucked, not skinned. A fair-sized bandicoot will make a good meal for four persons. These animals live entirely on grain and roots and are, consequently, "clean" game. The rabbit is far inferior as food to the bandicoot.



The trap here shown is most effective. It has a false floor, which, on the entrance of the animal, collapses and releases the lever of a trap-door, which then falls and closes the entrance. A second door at the back is then raised, a bag having been previously stretched over the mouth of the log, and the prisoner rushes into the bag, where he meets his fate. All that is wanted to construct the trap is a hollow log about 5 ft. long, having a pipe of 15 in. diameter. A false floor is hinged to the entrance, and a wire catch holds the door lever in position when the door is raised. When the bandicoot runs in to pick up the bait—maize or sweet potatoes—his weight releases the wire catch, the floor falls, and at the same time the door closes on the prisoner. As the trap is left out in all weathers, it should be made of hardwood. The false floor is attached to the wire by a thin piece of string.

SOCIETIES, SHOW DATES, ETC.

CHARLEVILLE.—Central Warrego Pastoral and Agricultural Association. This Association has decided to hold its Annual Show (postponed from the 27th and 28th May), on 30th September and 1st October next ensuing.

EMERALD.—Emerald Pastoral and Agricultural Society. The Annual Show, recently postponed, has been definitely fixed for the 6th and 7th August.

ROCKHAMPTON.—Rockhampton Agricultural Society. The show dates have been fixed for the 24th, 25th, and 26th July. The notification only reached us on the 12th July, too late for insertion in the issue of the Journal for that month.

The annual show of the Gympie Agricultural, Mining, and Pastoral Society has, owing to the prevailing epidemic, been postponed to the 12th and 13th November.

THE SOUTH JOHNSTONE CANE PEST DESTRUCTION BOARD.

The Secretary of the Board notifies that at a meeting held on Saturday, 7th June last, Mr. T. Sugden was appointed president, Mr. R. J. Wright, treasurer, and Mr. J. F. Edwards, secretary to the Board.

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR JULY, 1919.

Article.		JULY.
		Prices.
Bacon	lb.	9d. to 11d.
Barley	bush.	5s. 3d.
Bran	ton	£9 5s.
Broom Millet	"	£50 to £70
Broom Millet (Sydney price)	"	£65
Butter (First Grade)	cwt.	177s. 4d.
Chaff, Mixed	ton	£7 5s.
Chaff, Oaten	"	£10 15s. to £11
Chaff, Lucerne	"	£10 to £11 10s.
Chaff, Wheaten	"	£8
Cheese	lb.	11d.
Flour	ton	...
Hams	lb.	1s. 3d. to 1s. 10d.
Hay, Lucerne	ton	£8 to £11
Hay, Oaten	"	£11 10s.
Hay, Wheaten	"	...
Honey	lb.	4½d.
Maize	bush.	6s. 9d. to 7s.
Oats	"	6s. 6d.
Onions	ton	£21 15s.
Peanuts	lb.	4d. to 6d.
Pollard	ton	£10 5s.
Potatoes	"	£16 to £18
Potatoes (Sweet)	sug. bag	6s. to 6s. 6d.
Pumpkins (Cattle)	ton	£2 3s. to £3 10s.
Turnips (Swede)	"	£2 10s. to £3
Turnips, per dozen bunches	...	4d. to 9d.
Eggs	doz.	2s. 2d. to 2s. 6d.
Fowls	per pair	5s. to 8s.
Ducks, English	"	4s. to 5s.
Ducks, Muscovy	"	5s. to 8s. 6d.
Geese	"	5s. to 6s.
Turkeys (Hens)	"	10s. 5d. to 14s.
Turkeys (Gobblers)	"	20s. to 28s. 6d.
Wheat (Milling)	bush.	6s. 6d. to 11s.

VEGETABLES—TURBOT STREET MARKETS.

Beans, per sugar-bag	6s. to 15s.
Beetroot, per dozen bunches	1s. to 1s. 6d.
Cabbages, per dozen	2s. 6d. to 7s.
Carrots, per dozen bunches	1s. 3d. to 2s.
Cauliflowers, dozen	3s. to 25s.
Cauliflowers (small), dozen	3s. to 6s. 6d.
Cucumbers, per dozen	6d. to 2s. 6d.
Lettuce, per dozen	6d. to 1s.
Marrows, per dozen	1s. to 2s. 6d.
Parsnips, per dozen bunches	...
Peas, per sugar-bag	9s. to 16s.
Potatoes (Sweet), per cwt.	6s.
Pumpkins (table), per cwt.	5s. 6d. to 7s. 6d.
Tomatoes, per quarter-case	1s. 6d. to 9s.
Turnips, per dozen bunches	4d. to 9d.
Turnips (Swedes), per sugar-bag	1s. 6d. to 3s.

SOUTHERN FRUIT MARKETS.

Article.	JULY. Prices.
Bananas (Queensland), per case	...
Bananas (Tweed River), per case	21s. to 24s.
Lemons, per bushel-case	11s. to 12s.
Mandarins per case	10s. to 11s.
Oranges (local), per bushel-case	9s.
Oranges (Navel) per bushel case	14s. to 15s.
Passion Fruit (Victorian), per double-case	12s. to 28s.
Pineapples (Queens), per case	9s. to 14s. 6d.
Pineapples (Ripleys), per case	8s. to 12s.
Pineapples (Common), per case	8s. to 12s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per case	10s. to 14s.
Apples, Cooking, per case	11s. to 13s.
Bananas (Cavendish), per dozen	3½d. to 8½d.
Bananas (Sugar), per dozen	3½d. to 8½d.
Cape Gooseberries, per quarter-case	7s. to 10s.
Citrons, per cwt.	10s.
Cocoanuts, per sack	15s. to 25s.
Custard Apples, per quarter-case	4s. to 8s.
Lemons (Lisbon), per half-case	3s. to 5s.
Lemons (Rough), per half-case	3s. to 4s. 6d.
Mandarins, per case	5s. to 17s. 6d.
Oranges (Seville), per cwt.	17s.
Oranges (Navel), per cwt.	10s. to 15s.
Oranges, (other), per cwt.	8s. to 11s.
Papaw Apples, per quarter-case	1s. 9d. to 3s. 6d.
Passion Fruit, per half-bushel case	5s. to 9s.
Pears, per case	11s. to 11s. 6d.
Pineapples (Rough), per dozen	1s. to 2s. 6d.
Pineapples (Smooth), per dozen	5s. 6d. to 6s.
Pineapples (Ripley), per dozen	3s. 6d. to 5s.
Rosellas, per sugar-bag	4s. to 5s. 9d.
Strawberries, per dozen boxes	6s. to 20s.
Tomatoes (prime), per quarter-case	5s. 6d. to 10s. 6d.
Tomatoes (inferior), per quarter-case	2s. 6d. to 3s. 6d.

TOP PRICES, ENOGGERA YARDS, JUNE, 1919.

Animal.	JUNE. Prices.
Bullocks	£20 to £25
Cows	£13 17s. 6d. to £15 12s. 6d
Cows (Single)	£17 12s. 6d.
Merino Wethers	41s.
Crossbred Wethers	50s. 6d.
Merino Ewes	28s. 9d.
Crossbred Ewes	50s. 6d.
Lincoln Ewes	26s. 6d.
Lambs	33s.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET.

AT BRISBANE.

1919.	MAY.		JUNE.		JULY.		AUGUST.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6·13	5·17	6·30	5 0	6·39	5·3	6·30	5·18
2	6·14	5·16	6·30	5·0	6·39	5·3	6·30	5·18
3	6·14	5·15	6·31	5 0	6·39	5·4	6·29	5·19
4	6·15	5·14	6 31	5·0	6·39	5·4	6·28	5·19
5	6·15	5·13	6·32	5·0	6·39	5·5	6·28	5·20
6	6·16	5·13	6 32	5·0	6·39	5·5	6·27	5·21
7	6·16	5·12	6·33	5·0	6 39	5·5	6 26	5·21
8	6·17	5·11	6 33	5·0	6·39	5·6	6·26	5·22
9	6·17	5·11	6·34	5·0	6·39	5·6	6·25	5·22
10	6·18	5·10	6·34	4·59	6·39	5·7	6 24	5·23
11	6·19	5·9	6 34	4·59	6·39	5·7	6·23	5·23
12	6·19	5·9	6·35	4·59	6·39	5·8	6·23	5 24
13	6·20	5·8	6·35	4·59	6·38	5·8	6 22	5·24
14	6·20	5·8	6·36	4·59	6·38	5·9	6·21	5 25
15	6·21	5·7	6·36	5·0	6·38	5 9	6·20	5·25
16	6·21	5·6	6·36	5·0	6·38	5·10	6·19	5·26
17	6·22	5·6	6·37	5·0	6·37	5·10	6 18	5 26
18	6·23	5·5	6 37	5·0	6·37	5·11	6·17	5·27
19	6 23	5 5	6 37	5·0	6·37	5·11	6·16	5·27
20	6·24	5·4	6 37	5 0	6·36	5·12	6·15	5·28
21	6·24	5·4	6·38	5 0	6·36	5·12	6·15	5·28
22	6·25	5·3	6·38	5·0	6·36	5·13	6 14	5·29
23	6·25	5·3	6·38	5·1	6·35	5·13	6·13	5·29
24	6·26	5·3	6·38	5·1	6·35	5·14	6·12	5·30
25	6 26	5·2	6·39	5·1	6·34	5 14	6·11	5·30
26	6·27	5·2	6·39	5·1	6·34	5·15	6·10	5·31
27	6·27	5·2	6·39	5·2	6·33	5·15	6·9	5·31
28	6·28	5·1	6·39	5·2	6·33	5·16	6·8	5·32
29	6·28	5·1	6·39	5·2	6·32	5·16	6 7	5·32
30	6·29	5·1	6·39	5·3	6 32	5·17	6·6	5·33
31	6·29	5·0	...	...	6 31	5·17	6·5	5·33

PHASES OF THE MOON.

The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.

			H.	M.	
7 May	☾	First Quarter	9	34	a.m.
15 „	○	Full Moon	11	2	a.m.
23 „	☽	Last Quarter	8	4	a.m.
29 „	●	New Moon	11	12	p.m.

The Moon will be at its farthest distance from the earth on the 14th, and at its nearest on the 29th, when there will be a total eclipse of the Sun visible in Africa and S. America, but not in Australia.

5 June	☾	First Quarter	10	22	p.m.
14 „	○	Full Moon	2	28	a.m.
21 „	☽	Last Quarter	3	33	p.m.
28 „	●	New Moon	6	53	a.m.

The Moon will be at its farthest distance from the earth on the 10th, and nearest on the 26th.

5 July	☾	First Quarter	1	17	p.m.
13 „	○	Full Moon	4	2	p.m.
20 „	☽	Last Quarter	9	3	p.m.
27 „	●	New Moon	3	21	p.m.

The Moon will be farthest from the earth on the 8th, and nearest on the 24th.

4 Aug.	☾	First Quarter	6	12	a.m.
12 „	○	Full Moon	3	40	a.m.
19 „	☽	Last Quarter	1	56	a.m.
26 „	●	New Moon	1	37	a.m.

The Moon will be farthest from the earth on the 5th, and nearest on the 18th.

For places west of Brisbane, but nearly on the same parallel of latitude—27½ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during May, June, and July, and to the middle of August may be roughly arrived at by adding 20 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night; when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Farm and Garden Notes for September.

FIELD.—Spring has now arrived, and with it there will be the usual trouble with weeds, especially on carelessly prepared ground. Therefore, the cultivator and the horse and hand hoe must be kept vigorously at work to check the weed pests and save the growing crops as well as much future labour. Attend to earthing up any crop which may require it. There may possibly occur drying winds, dry weather, and even very late frosts, which have not been unknown in parts of this State even as late as September. Still, good showers may be looked for in October, and much useful work may be done during the present month which will go far to afford a fair prospect of a good return for labour. Plant out *Agava rigida*, var. Sisalana (sisal hemp plant), in rows 6 to 8 ft. apart, according to the richness of the soil. Especially should limestone country be selected for the purpose. Sisal will do no good if planted on low-lying wet land, or on a pure sandy soil. It thrives best where there is plenty of lime, potash, and phosphoric acid, all of which (except potash, unobtainable under present war conditions) can be cheaply supplied if wanting in the soil. Sisal requires very little labour from planting to maturity. The price of the fibre now ranges from £40 to £70 per ton for British East African, and the Mexican as low as £28. Sow cotton—Sea Island near the coast, and Uplands generally. Caravonica succeeds best in North Queensland. Sow maize, sorghum, imphee, mazzagua, Indian cane, prairie grass, Rhodes grass, and paspalum, panicum, tobacco, pumpkins, and melons, including the Casseba melon. Sugar-cane planting should be vigorously carried on. Plant sweet potatoes, yams, peanuts, arrowroot, turmeric, chicory, ginger, and canaigre, the latter a tuber yielding a valuable tanning substance. Plant out coffee.

KITCHEN GARDEN.—Now is the time when the kitchen garden will richly repay all the labour bestowed upon it, for it is the month for sowing many kinds of vegetables. If the soil is not naturally rich, make it so by a liberal application of stable manure and compost. Failing a sufficient supply of these, artificials may be used with good results. Dig or plough the ground deeply, and afterwards keep the surface in good tilth about the crops. Water early in the morning or late in the evening, and in the latter case, stir the soil early next day to prevent caking. Mulching with straw, leaves, or litter will be of great benefit as the season becomes hotter. It is a good thing to apply a little salt to newly dug beds. What the action of salt is, is not exactly known, but when it is applied as a top dressing it tends to check rank growth. A little is excellent for cabbages, and especially for asparagus, but too much renders the soil sterile, and causes hardpan to form. French or kidney beans may now be sown in all parts of the State. The Lima bean delights in the hottest weather. Sow the dwarf kinds in drills 3 ft. apart and 18 in. between the plants, and the climbing sorts 6 ft. each way. Sow Guada bean, providing a trellis for it to climb on later. Sow cucumbers, melons, marrows, and squash at once. If they are troubled by the red beetle, spray with Paris green or London purple. In cool districts, peas and even some beetroot may be sown. Set out egg plants in rows 4 ft. apart. Plant out tomatoes 3½ ft. each way, and train them to a single stem, either on stakes, trellis, or wire netting. Plant out rosellas. Sow mustard and cress, spinach, lettuce, vegetable marrows, custard marrows, parsnips, carrots, chicory, eschalots, cabbage, radishes, kohl-rabi, &c. These will all prove satisfactory, provided the ground is well worked, kept clean, and that water, manure, and, where required, shade are provided.

FLOWER GARDEN.—Continue to plant bulbs as directed last month. Protect the plants as much as possible from cold westerly winds, which may still occur, notwithstanding the increasing temperature. Be careful that the bulbs do not come in contact with fresh manure. Keep a good lookout for slugs. Plant out chrysanthemums, palms, and all kinds of tropical and semi-tropical plants. If hot weather should ensue after planting, water and shade must be given. Sow dianthus, snapdragon, and coleus, seed or cuttings of the latter. Roses will now be in full bloom. Keep them free from aphis, and cut off all spent blooms. This latter work should be done in the case of all flowers. If you wish to save seeds, do not wait for the very last blooms, but allow some of the very best to go to seed. If you have any toads in the garden or bush-house, encourage them to take up their abode there. They are perfectly harmless, in spite of their ugliness, and they destroy an astonishing number of insects injurious to plants. Fill up all vacancies with herbaceous plants. Sow zinnia, gaillardia, amaranthus, cockscomb, balsam, sunflower, marigold, cosmos, summer chrysanthemum, coreopsis, portulaca, mesembryanthemum, calendula, &c.

Orchard Notes for September.

THE SOUTHERN COAST DISTRICTS.

The marketing of citrus fruits, in the later districts, of the late winter or early spring crop of pines and bananas, also of strawberries and Cape gooseberries, will continue to occupy the attention of fruitgrowers. We can only repeat the advice we have so often given in these Notes respecting the marketing of all kinds of fruit—viz., to grade the fruit evenly, pack honestly, and display it to the best advantage if you want to get good returns.

September is a very important month to the fruitgrower, owing to the fact that it is usually a dry month, and that it is essential in all cases to keep the land in a high state of tilth, so as to retain the moisture that is required by the various trees that are in blossom, thus securing a good set of fruit. Where irrigation is available, it is advisable to give trees a good watering should the ground be dry, as this will induce a good growth and cause the fruit to set well. If an irrigation is given, it should be a thorough one, not a mere surface watering, and once the land is saturated the moisture must be retained in the soil by constant and systematic cultivation. If this is done, one good watering will usually be enough to carry the trees through in good condition to the thunderstorms that come later or even to the summer rains, if the soil is of a deep sandy loamy nature.

No weeds must be allowed in the orchard or vineyard at this time of the year, as they are robbing the trees and plants of both the water and plant food that are so essential to them at this period of their growth.

There is not much to be done in the way of fighting scale insects during the month, as they are more effectually dealt with later on; but where young trees are showing signs of distress, owing to the presence of scale insects, they should be treated, the gas method being the most efficacious.

Beetles and other leaf-eating insects often make their appearance during the month. The best remedy is to spray the trees or plants with one or other of the arsenical washes that are recommended by me in this Journal. The vineyard will require considerable attention. Not only must it be kept well worked, but any vines that are subject to the attack of black spot must be sprayed from time to time with Bordeaux mixture. Disbudding must be carefully caried out, as this work is equally as important as the winter pruning, as it is the best means of controlling the future shape of the vine. A very common fault with vines grown in the coast districts is that the buds often remain dormant, only the terminal bud and possibly one other starting into growth, thus leaving a long bare space on the main rods, which is undesirable. When this takes place, pinch back those shoots that have started, and which are taking the whole of the sap, and force the sap into the dormant buds, thus starting them into growth. This will result in an even growth of wood all over the vine—not a huge cane in one part and either a stunted growth or dormant buds on the rest.

Every care should be taken during the month to prevent the fruit-fly from getting an early start. All infested oranges, loquats, kumquats, or other fruits should be gathered and destroyed, as the keeping in check of the early spring crop of flies, when there are only comparatively few to deal with, will materially lessen the subsequent crops. Land that is to be planted to pines or bananas should be got ready now, though the planting need not be done till October, November, or even later. Prepare the land thoroughly; don't scratch the surface to the depth of a few inches, but plough as deeply as you have good surface soil, and break up the subsoil as deeply as you can possibly get power to do it. You will find that the extra money expended will be a profitable investment, as it will pay every time.

THE TROPICAL COAST DISTRICTS.

September is usually a very dry month, and fruit trees of all kinds suffer in consequence. The spring crop of citrus fruits should be harvested by the end of the month, as, if allowed to hang later, there is a great risk of loss by fly. The fruit should be well sweated, and, if carefully selected, well-graded, and well packed, it should carry well to, and fetch high prices in, the Southern States, as there are no oranges or mandarins grown in Australia that can excel the flavour of the best of the Bowen, Cardwell, Cairns, Port Douglas, or Cooktown fruit.

As soon as the fruit is gathered, the trees should be pruned and sprayed with the lime and sulphur wash, as this wash is not only a good insecticide, but it will keep down the growth of all lichens, mosses, &c., to which the trees are very subject.

Every care should be taken to keep down the fruit-fly during the month. All infested fruit should be gathered and destroyed, particularly that in or adjacent to banana plantations. Watch the banana gardens carefully, and keep well cultivated. New land should be got ready for planting, and where land is ready planting can take place.

Papaws and granadillas are in good condition now, and, if carefully gathered and well packed in cases only holding one layer of fruit, they should carry well to the Southern markets if sent in the cool chamber.

THE SOUTHERN AND CENTRAL TABLELANDS.

Prune grape vines at Stanthorpe in the early part of the month, leaving the pruning as late as possible, as the object is to keep the vines back in order to escape damage from late spring frosts. All vines subject to the attack of black spot should be treated with the winter dressing when the buds are swelling; this treatment to be followed by spraying with Bordeaux mixture later on.

Where fruit trees have not received their winter spraying, they should be treated at once before they come out into flower or young growth. Where the orchard or vineyard has not been ploughed, do so, taking care to work the land down fine as soon as it is ploughed, so as to keep the moisture in the soil, as the spring is always the trying time for fruit trees.

Look out for fruit-fly in the late oranges and loquats in the Toowoomba district. Keep the orchards and vineyards well cultivated; disbud the vines when sufficiently advanced. Spray for codlin moth.

In the Central tablelands irrigate vines and fruit trees, and follow the irrigation with deep, constant, and systematic cultivation. Keep down all weed growth, and fight the red scale on citrus trees with cyanide. The objective of the fruitgrowers throughout Queensland during September and the following months is, "How best to keep the moisture in the soil that is required by the trees, vines, plants, and vegetables"; and this objective can only be obtained by irrigation where same is available, or by deep, systematic, and constant cultivation where there is no water available for irrigation.